

# THE PSYCHO-PHYSICAL FOUNDATIONS OF MODERN PIANO-TECHNIQUE

BY

PETER RAMUL

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C. F. KA H N T · L E I P Z I G



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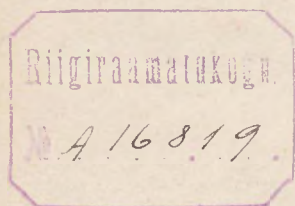


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PETER RAMUL



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# INTRODUCTION

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## I. PEDAGOGY OF PIANO PLAYING AS A SCIENCE

The fact that definite concepts and a clear understanding of many problems related to pedagogy of piano playing were hitherto lacking has led to various misunderstandings and wide differing of opinions in practical instruction, resulting in the invention of innumerable methods of teaching the piano. It is, therefore, only natural that a sounder basis for instruction is required, i. e. a scientifically based method designed to lead to a maximum success with a minimum expenditure of time and energy. Obviously the result would be that systematic piano teaching would no longer be dependent on opinions of individuals, but based upon scientific facts established by psychology, physiology, anatomy, mechanics, and physics. Though at present an independent science of piano pedagogy cannot be said to exist, much that is related to the playing of the piano can be based on accepted theories of other sciences, thus obviating further discussion of a considerable number of problems now at issue. Piano pedagogy, however, promises to develop in the near future into an independent science, at present still designated by various names such as, pedagogics of piano playing, pedagogy, methods and methodology of piano playing, and so forth. We select the name "Pedagogy of Piano Playing", or simply, "Piano Pedagogy", adding, however, that less depends on the name than on the fact that this branch of science is about to be realized.

The first attempts to clarify some problems of piano technique date back to the times of the classics. The first

significant work on this field is that of P h. E m. B a c h, "Versuch über die wahre Art das Klavier zu spielen" (new edition by Walter Niemann, published by C. F. Kahnt, Leipzig).

All subsequent publications on the same subject, up to the eighties of last century, command little interest. Thorough investigation of the problems connected with piano playing has been commenced only recently. Some of these investigators continue to adhere to the principle of isolated finger technique; among these are K ö h l e r, K u l l a k, G e r m e r, R i e m a n n, and J a ë l l. The majority, however, basing their statements upon accepted facts from the science of physiology, discard this principle altogether; moreover, experts are commencing to emphasize the psychical aspect of the matter, the psychical activity of the player being regarded as a moment of capital importance. Much inspiration in this direction has been given by the well-known piano pedagogue D e p p e, of Berlin, who must be designated as the founder of modern piano pedagogy, although he did not publish anything on the subject himself. His merits lie in the arousing of a keen interest in piano-technical problems in his pupils, and the result thereof was that a number of interesting publications appeared, such as the works of Clark-Steiniger, Klose, Söchting, Caland, Bandmann, and others. The same subject-matter is also treated by Raif, Ritschl, Steinhausen, and Breithaupt, whose book: "Die natürliche Klaviertechnik" ("Natural Piano-Technic", published by C. F. Kahnt, Leipzig), commands especial attention, and represents the largest work in piano pedagogy.

Recently associations and clubs of piano players have organized branch associations in the larger cities, the object of which is to study piano-pedagogical problems, and to interest the public in their favour by keeping the press informed. The mere fact that such associations exist proves the keen interest evinced by the musical world in problems relating to piano pedagogy.



## II. THE OBJECT OF PIANO PEDAGOGY

Piano playing, viewed in the light of piano pedagogy, must be considered from two essentially different points of view, the technical and the artistic. The aim of the former is to indicate the briefest possible way towards attaining the best possible accomplishment in clearness of touch, velocity, strength, and sonorousness. The technique of piano playing may also be regarded from two different points of view: the psychical and the mechanical. In the first case the psychical properties, i. e. intellect, will, sensations, and feeling, as well as their participation in piano playing, form the objects of consideration, while the second concerns the actions of the arms, i. e. the various styles of technical execution. At this point piano pedagogy will be seen to be closely related to various branches of science: psychology, in so far as the psychical functions influence physical action; physiology of the motoric apparatus, in as much as all physical motions are effected by tension and relaxation of the groups of muscles attached to the skeleton; anatomy to the extent that information is afforded on the structure and the movements of the arms; mechanics because the arm with all its parts constitutes a mechanical apparatus; and, finally, physics, in matters concerning acoustics (cf. the chapter on the pedal).

Piano technique must accordingly be subdivided into two sections: **"Psychology of Technique"**, and **"Mechanics of Technique"**. These two kinds of technical functions, — the psychical and the mechanical or, the internal and the external, — are intimately related and cannot be treated distinctly or independently when learning to play the piano.

The technique of piano playing when regarded in the sense of psychical and mechanical functions, is in its turn closely related to artistic performance. This interdependence is made manifest from the fact that the conscious acquisition of the various styles of technical execution provides the requisites for the mastery of artistic problems which present themselves.

With regard to aesthetics, the object of piano peda-

gogy is to afford instructions for the cultivation of artistic capacities.

Artistic and technical development must go hand in hand, because artistic performance is inconceivable without sufficient technique, and, on the other hand, technical accomplishment without the artistic touch fails to produce the desired effects.

Among others, a question of capital significance is that of arousing the pupils' love for music, especially at a youthful age, simultaneously with their interest in technical exercises. It is, therefore, advisable for the teacher to select such exercises that are calculated to bring technical advancement as well as having an intrinsic musical value. Examples of such music are the "Preludes" and "Studies" by Chopin. Joseph Hofmann advises devoting a minimum of time upon purely mechanical work involving "neither brain nor heart", and recommends the playing of valuable compositions from which the material required for technical exercises may be derived, if suitably chosen. This naturally presupposes that the teacher has an adequate knowledge of piano literature.

It seems almost superfluous to point out that practising of scales, arpeggios, and the like still remains indispensable. Such practising must not, however, be regarded as the final aim, but as a means to acquire the mastery of the keyboard only. Summarizing the preceding statements, the field of piano pedagogy may be said to comprise: the psychical and mechanical functions with regard to piano technique, and their connection with artistic or aesthetic development.

### III. INDIVIDUAL ELEMENT IN PIANO PEDAGOGY

It has been pointed out in the preceding pages that piano pedagogy must derive its foundations from established scientific facts. All foundations laid down in accordance with this rule are immutable as such, but it would nevertheless be erroneous to assume that their application in practice could be

performed according to a fixed standard, as in each instance a different personality is concerned. Hence the application of the principles governing piano pedagogy must be suited to, and made dependent upon, individual character. The teacher's first duty is to form a clear image of the capacities and deficiencies of his pupil, and in doing this various items must be taken into consideration, such as the general degree of development, the musical talents, the personal character, the peculiar formation of the arm, the circumstances under which the pupil lives, and numerous others. These points having been carefully analysed one has to appoint the exercises and studies corresponding to the technical and aesthetic problems. In other words, it is the task of the teacher to "diagnose" his pupil, to prescribe a cure for all deficiencies discovered, and then to indicate the direction in which further development is to be sought. The execution of the program naturally depends on the capacity of the pupil, and on the knowledge and experience of the teacher.

#### IV. PURPOSE AND AIM OF THIS BOOK

There is no questioning the fact that no number of books, regardless of their excellence, can replace personal instruction and practical demonstrations. There is, however, the circumstance to bear in mind that only very few are given an opportunity to become acquainted with the foundations of modern piano pedagogy. The large majority of students fail to acquire even a superficial knowledge of the foundations of piano pedagogy, and they must accordingly gather all that is required in this respect from books, if they are available. But even if practical demonstration and teaching are provided, it will be advisable to supplement the knowledge derived therefrom by a thorough study of the literature, as reading not unfrequently induces questions and problems that have not occurred to the student.

It is a regrettable fact that the study of modern piano pedagogy through the medium of books still presents numerous



difficulties. Either the book deals only with a select and restricted number of problems, and fails to give an adequate account of the foundations of piano pedagogy as a complete system, or it may have been written in a superficial dilettant manner, and then it bears the stamp of the casual or incidental. In addition to these, there is the further difficulty that the larger works, such as that of Breithaupt, "Die natürliche Klaviertechnik" ("The Natural Piano-Technic"), are too voluminous and therefore rarely accessible. Another item that augments the obstacles is the terminology, which has not yet been standardized in this field. Last, but not least, the greater number of the works in question fail to indicate exercises, studies, and pieces concerning the problems discussed, thus diminishing their practical utility.

The object of the present work is to present a systematic, generally comprehensible, brief exposition of the technical foundations of modern piano pedagogy, and at the same time to indicate corresponding exercises, studies, and piano pieces of various degrees of difficulty. It does not purport to be a "school" in the usual sense of the word: there are no explanations about the keyboard, notes, pauses, bars, scales, etc., all of which may be derived from any ordinary piano "school" or instruction book, and which call for no special knowledge on the part of the teacher.

We have also disregarded the problems of piano pedagogy relating to aesthetics.

We do not profess to have solved the problems that we have discussed ultimately or completely. To attain this end, the collaboration of all those interested in the corresponding problems is requisite, and we shall always be deeply indebted for any hints or advices that may be offered.

# PART I

## PSYCHOLOGY OF TECHNIQUE

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### I. PSYCHICAL ACTIVITY IN PIANO PLAYING

Intellect, Will, Sensations, Feeling.

Psychology teaches us that the attention of human beings is first directed towards the objects of the visible world. The phenomena of the inner world are not observed until considerably later, and then great difficulties are usually encountered. This general psychological law applies also to piano playing, a circumstance that is rendered obvious from the fact that numerous pianists devote their entire energy and attention to the mechanical work, scarcely heeding the psychical activity at all. Nevertheless all the psychical functions, e. g. intellect, will, sensations, feeling, play an important part in the development of piano technique. The participation of the psyche in piano playing is, generally speaking, of the following nature.

We know from physiology that every movement is the result, not of the action of a single muscle, but of a group of muscles. In such a group of muscles we distinguish between those muscles the function of which is the simultaneous execution of a certain movement (*synergists*) and those which at the same time act in the opposite direction (*antagonists*). Muscular action is furthermore related to the nervous system which is composed of the nerve centres and their ramifications (*fibres*). The centres of the nervous system are located in the brain and the spinal cord, whence the nerve fibres branch out over the entire organism. Some of the nerve fibres extend to the surface of the skin and conduct incitations or irritations received from outside to the brain; thus we experience the

sensations of cold, heat, sound, etc., — these are called the *sensory nerves*. Other nerve fibres terminate in muscles, and serve to conduct incitations from the brain to the various parts of the body, effecting movements, — these are called the *motor nerves*. Finally, the brain is the centre of all our psychical activity, where the idea of each movement is primarily consciously conceived. It follows from this that our cognoscitive faculty constitutes the primary source of all our actions and that it governs these through the medium of the nervous system.

Our movements are governed by volitional impulses which are conducted from the nerve centres to, say, the arm with almost inconceivable rapidity; the two functions which we here distinguish, "volition" and "movement" are practically simultaneous, and in a certain sense form a single unit whole. Perfect accordance between the will and movement is, however, only attained gradually and after constant practice.

Our aim in practising must, therefore, be the conscious and volitional acquisition of such sensations in the arms, by the aid of which we are enabled to cause the various sets of muscles to co-operate in a manner suited to the various styles of technical execution. Thus, there are the sensations of the active and the passive states of the arm. In other words: practising must be transformed into a psychical process, otherwise it will be useless.

Initially the execution of a given movement requires concentrated attention. But after a certain period of practice we are able to carry out a considerable number of movements correctly, quickly, and in a certain sense unconsciously (automatically), but not mechanically; at this point the subconscious activity comes into action. There was, indeed, a time when we were learning to master each separate style of technical execution by constant attention and conscious volition. On the other hand, we also acquire the capability of repeating at any given time any style of technical execution that we have once consciously acquired. This would be impossible if the acquisition had been purely mechanical.



Finally, by the aid of our sense of hearing, we control the sound that we have produced; we estimate the extent to which it agrees with our intention. The attainment of complete agreement between the tone produced and our intention is, of course, the ultimate aim of piano technique.

It is only at this stage that we come to the domain of internal experience, the domain of artistic feeling and perception, which is allied with aesthetics and not with piano technique. The technical material constitutes in a certain sense the source of supply for our means of realizing and reproducing artistic feelings.

It is known from psychology that all psychical phenomena, such as intellect, will, sensations, feeling, are intimately related and invariably co-operate in every action of our conscious life. This law of unity of the psychical faculties may also be applied to piano playing when considered as a conscious activity.

Steinhausen gives an excellent description of our psychical and mechanical activity in piano playing: he compares the brain to the central government of a state, the sensory and motory nerves to the local authorities which are governed and controlled by the central government, the brain; the volitional impulses, finally, are compared to telegraphic connections by means of which the activities of the local authorities are directed and kept under control.

## II. THE ORGANIC CONNECTION BETWEEN PSYCHICAL AND MECHANICAL ACTIVITY IN PIANO PLAYING

### Raif's Experiments.

In the preceding part we pointed out that every movement of the arm is the result of the action of a group of muscles governed by the mind through the medium of the nervous system by corresponding volitional impulses. It follows from this that there is some organic connection between psychical and mechanical activity in piano playing. If, in playing the

piano, our psyche does not participate, all our actions lose their natural organic and systematic connection and are liable to be completely or at least partially destroyed. To prove this statement we might mention the well-known instances of brain diseases which cause some parts of the body to be paralysed. Similar "brain diseases" occur in piano playing when instead of progressing, technical development stands still in spite of constant and arduous practice, or when the fingers refuse to move without being tired.

It is a fatal mistake to think of other things while performing technical exercises, or to read the newspaper, as a disruption between the psychical and mechanical activity takes place by reason of our failure to force our mind to receive consciously the sensations, which should be the aim and object of practising. The only means by which the monotony of technical exercises can be overcome is perfect concentration upon the essentials of the exercise, and the will to acquire the capability to perform the desired movements, accompanied by the conviction that only by such practice the best results can be achieved within the briefest time.

It is also erroneous to resort to all sorts of mechanical apparatuses and contrivances designed to expand the hand and to facilitate velocity, as this also means neglecting the psychical functions. It is thus only natural that all these external appliances fail to produce what they are intended to produce, and in many instances they prove to be harmful; we may convince ourselves in their imaginary usefulness by discarding them. Besides, similar contrivances weaken and tire the hand excessively.

The habit of practising with the metronome must also be condemned as it fails to assist us in playing more rhythmically. Pianists using a metronome aspire to uniform and rhythmic playing merely by mechanical and unconscious means; it is only necessary to stop the metronome and the player will be seen to lose his ground, to flounder, thus proving that no actual profit is derived from this instrument. It is different with playing without a metronome, where the player exercises

his will-power in the conscious endeavour to attain uniformity. It is psychologically impossible to achieve uniform playing by the aid of a metronome, as it must be borne in mind that, in listening to the beats of the metronome, the proper moment at which the tones on the piano should be struck is missed, so that the tones occur later than indicated by the metronome beats. If, on the other hand, we endeavour to attain simultaneity of tone-striking and the beats of the metronome, the action of striking must be performed before the metronome is heard, and the metronome then becomes wholly superfluous. In endeavouring to follow the metronome we have a tendency to hasten, thus making our playing hurried and nervous. In short, a metronome cannot teach rhythmic playing, and not only that, but playing to the metronome has also to be learned. A metronome is also injurious inasmuch as its beats rarely occur with absolute regularity. Breithaupt says: "The metronome of the nervous system is superior to that of Maelzel."

Raif's experiments concerning the significance of psychical activity in the development of piano-technique are extremely interesting. He first proves that each of our fingers is by nature already endowed with the capacity for velocity that is required for piano-playing. Raif experimented with persons of various professions and came to the ultimate conclusion that every human being is capable of making five to six strokes per second with the second and third fingers, four to five with the others. Assuming for the sake of argument that each of our five fingers is capable of performing only four strokes per second, that would make twenty strokes per second, — a speed at which the succession of tones is apprehended by the ear as a mere indistinct blurred sound; in other words, the succession of tones that can be produced is more rapid than the analytic capacity of the ear to apprehend tones. According to the results obtained by experimental psychology, the capacity of the ear for apprehension and distinction of tones, is about 15 tones per second; this limit varies considerably according to intensity of attention, the type of passages played, and the pitch of the



tones [cf. E. Jentsch: "Musik und Nerven" (Music and Nerves), Wiesbaden 1904].

To demonstrate the comparatively small part performed by the single fingers in attaining the auditory limit of velocity Raif quotes the following example. If, say, the C-major scale extending over two octaves is played with the metronome set at M. M. ♩ = 60, i. e. almost sixty fourths, the number of strokes executed by each of the five fingers will be the following:

1st finger 4 strokes per second

2nd „ 4 „ „ „

3rd „ 4 „ „ „

4th „ 2 „ „ „

5th „ 1 „ „ „

---

Totalling 15 strokes per second.

As a matter of fact the number of strokes executed by eminent piano virtuosi in most rapid passages is far less than the above limit. Raif quotes four instances of ideal execution and especial velocity: Rubinstein in the last movement of Chopin's B $\flat$ -minor sonata; Tausig in the final part of Weber's Concert-Piece; Bülow in Chopin's F $\sharp$ -major Impromptu, and the passages in semiquavers in the last movement of Mendelssohn's G-minor concerto as executed by various pianists of repute. In all these cases, which required special volubility of the fingers, Raif ascertained by means of the metronome that the number of strokes per second for five fingers did not exceed twelve, so that on an average each finger struck scarcely more than twice.

On the basis of the above experiment two facts were determined by Raif: firstly, the limit of the capacity of our ear to distinguish the single tones in rapid passages is identical with the limit of our finger-volubility, and any speeds exceeding this are of no musical value whatever. Secondly, there is no necessity for a pianist to increase the volubility of his fingers, as each of them is by nature already endowed with the appropriate capacity for performing at a greater rate than required by piano playing. The difficulty of technical accomplishment consists, according to Raif's definition, in striking at the p r o p e r

time with the proper fingers. This is dependent on the constitution of the nervous system and of the nervous centres which govern the movements of the fingers by volitional impulses.

Raif also proves that frequent repetition of given exercises by no means increases the velocity of our fingers beyond the innate capacity. A number of tests made with pupils during a period of several years evinced that, though technical accomplishment was improved, the capacity for speed of each of the five fingers remained what it had been in the incipency. Exercises may conduce to improvement of strength and endurance, but not of finger velocity.

Raif maintains that the only manner in which speed could possibly be increased consists in elimination of faulty, false, or superfluous movements, but not in frequent repetition of given exercises. But before such faulty and superfluous movements can be eliminated, it must be determined of what elements they are composed. Only after the errors have been ascertained, the will-power may be exerted in order to correct them, and at the same time the necessary new sensations can be acquired; in short, it is the psychical activity alone which increases the finger velocity in this instance, not innumerable repetitions of one and the same movement.

Raif's experiments further showed that educated persons had a greater capability for performing a maximum number of movements than intellectually undeveloped individuals. Obviously the greater psychical activity of the educated persons constituted the decisive moment determining the speed.

Amongst the non-pianist persons with whom experiments were performed there were some who were capable of executing as many as seven strokes per second with a given finger, while many good pianists could only perform five at most. These experiments prove still more the fact that the velocity of movement is entirely independent of frequent repetition, and dependent only on increased psychical activity.

Raif also induced some of his pupils by way of experiment

to exercise one hand \*) only, with the result that the hand that had meanwhile been idle, had attained almost the same speed as the hand which had been practised. By the aid of a metronome Raif determined the rapidity with which his pupils could play various exercises (scales, arpeggios, trills, chords, etc.) with each hand separately. The average velocity for the right hand was M. M. ♩ = 120, for the left hand M. M. ♩ = 116, in semiquavers. After the elapse of one week the speed of the right hand had increased to ♩ = 126, after a further week to ♩ = 132; two months after commencing the exercises the right hand had attained a speed of ♩ = 186. Then, when the pupils were instructed to commence the same exercises with the left hand, it was found that, notwithstanding its having been idle for a period of two months, its speed had become ♩ = 152. It is clear that the increase of velocity of the unpractised hand could only have been attained by the volitional impulse which was directed towards the increase of speed of the practised hand, and which subconsciously had also passed to the left hand, so that the left hand without practice acquired those sensations which the right hand had acquired by practice.

By a further series of experiments Raif also proved the interdependence of the psychical state of students and of their piano technique. It was found that during a period of cheerfulness psychical activity and technical exercises or playing of passages on the piano could be performed with much greater ease and uniformity than during periods of mental depression and despondency, which in many cases proved to make working totally unproductive and useless.

After demonstrating the intrinsic significance of psychical activity in piano playing Raif concludes the interesting ex-

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\*) In a strictly anatomical sense the term "hand" denotes only a certain part of the arm (cf. part II, 1). In practice, however, when discussing piano playing the word "hand" is generally used for the entire arm, e. g. playing with the right or left hand.



position of his experiments with the words: **"Not velocity of fingers, but that of intellect and thinking must be trained and fostered in our pupils"**.

From what we have said in the preceding it will now be clear that 1) the foundation and primary source of piano-technique is not to be found in frequent repetition of movements, but in our psyche, and that therefore 2) our attention should be constantly, and from the very first lesson on, devoted to the development of the psychical activity as an adequate basis of an accomplished technique.

### III. CONDITIONS FAVOURING PSYCHICAL ACTIVITY IN PIANO PLAYING

1. Rhythm, 2. Musical Thinking, 3. Strengthening of the Nervous System, 4. Appropriate Division of Time in Practising, and 5. Playing from Memory.

In piano playing as in everything else the two essential conditions for success are diligence and attention of the pupils. The best teacher is unable to teach an idle, inattentive pupil, whereas, when assisted by good will and a clear mind, even the most awkward arm may be trained and technically developed, provided only that the two essential factors, physical strength and the capacity of muscles to move are present.

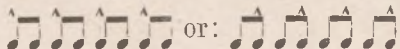
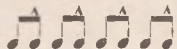
Besides these indispensable general conditions there are a few more special ones which help psychical activity in piano playing, namely: 1. Rhythm, 2. Musical Thinking, 3. Strengthening of the Nervous System, 4. Appropriate Division of Time in Practising, and 5. Playing from Memory.

#### 1. Rhythm: its Concept and Significance.

Generally speaking, rhythm may be defined as the systematic order or arrangement of movements in time. Each rhythmical movement consists of two elements, a strong one

and a weak one, e. g. rise and lowering, attraction and repulsion, extension and contraction, etc. In rhythmical movements such two elements invariably alternate in uniform succession.

Rhythm is innate in the human organism; the action of the lungs and the heart, the movements of the feet and hands when walking, are all performed rhythmically.

Consciousness is not entirely separable from physical constitution; they are in fact intimately related, and therefore consciousness is also rhythmical in its nature, of which we may convince ourselves by making the following experiment. If you listen to the pulse of a metronome or of a pendulum, the beats of which are absolutely equal in strength, you will soon notice that the beats of the pendulum can only with difficulty be heard uniformly strong, i. e. perceived as being arhythmical. More than that; we may voluntarily hear the same beats louder or softer, thus:  or: 

Rhythm in the sense indicated above implies an essential economic principle which may be considered as a hidden force. When constantly active, our muscles are in a state of constant tension, and therefore tire out rapidly, whereas when exercised rhythmically each alternation in the movements affords some rest. When the movements are irregular the amount of energy expended is at times too great, at others too small, so that physical strength is wasted unnecessarily. In executing rhythmical movements, the moments of rest between the moments of activity correspond adequately to the physical power exerted.

In the same manner our essentially rhythmic consciousness always alternates between the moments of increase and decrease of attention recurring at regular intervals. It is impossible to maintain a state of strict attention for any long period of time, and the endeavour to do this leads to rapid tiring.

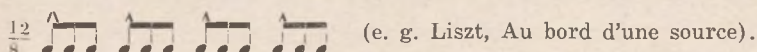
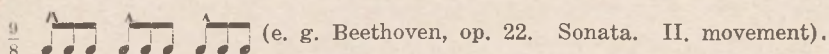
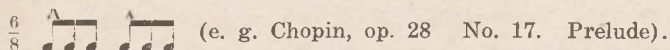
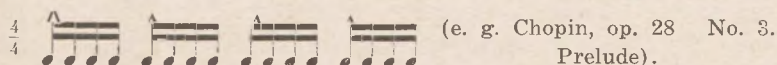
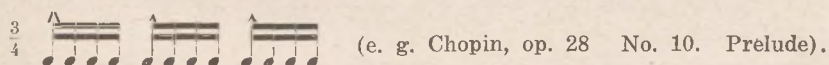
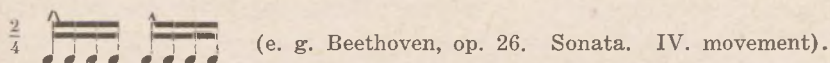
These variations of increase and decrease of attention must recur at regular intervals, as psychical energy will otherwise be expended unnecessarily.

Rhythm, therefore, enhances the human capacity for performance and permits utilization of a given quantity of physical and psychical energy through a longer period of time.

It is accordingly essential to employ and exploit rhythm in piano playing as well as in other fields of activity. This is done by accentuating at regular intervals the series of notes to be played. As a rule the periods of accentuation correspond to the bar, and hence the beginning of each bar should be stressed. At the same time our attention must concentrate chiefly on accented moments, and the necessary mental rest must be secured during the intervals.

In order to facilitate the maintenance of the connection between more or less distant rythmical accents, particularly with long series of notes, our consciousness appears to have a tendency to produce the fundamental rythmical accentuations and, in addition, supplementary stresses of a weaker nature.

For instance:





The foregoing will render clear the meaning of the terms "strong" and "weak" parts of a bar. In the beginning of a bar the fundamental rhythmic accentuations are executed with greater force than the supplementary rhythmic accentuations in the later parts.

Rhythm plays another rôle of intrinsic importance in piano playing, that, namely, of promoting the development of the so-called *a p p e r c e p t i v e* faculty of thinking.

The alternating increase and decrease of attention causes us to perceive the sounds consciously with different degrees of clearness and distinction. The moment in which the strongest accent is given, is perceived most clearly and distinctly; gradually the impressions grow less clear and distinct in proportion to their distance in time from the accentuated moment. The moment which is most clearly and distinctly perceived is called the focus or "*p o i n t o f f i x a t i o n*" of consciousness, while the remainder of our range of perception is called the "*f i e l d o f v i s i o n*". The foci serve as points of support to focus our entire perception, i. e. all that is received by our consciousness within the field of vision. The act of concentration of attention upon certain moments for the purpose of amalgamating or combining into a unit whole the entire agglomerate of impressions received, is termed "*a p p e r c e p t i o n*".

In order to make clear the significance of *a p p e r c e p t i o n* as applied to piano technique, we point out its function in what concerns the sense of sight. Experiments prove that a neophyte in reading is unable to perceive more than 3 or 4 letters at a time. On the other hand, practised readers can speedily and easily read, and apprehend the meaning of the longest words and even of a set of words. In fact, we are capable of apprehending a large set of words in thought quicker than we could pronounce them. The essence of the matter consists in the fact that in reading we do not perceive consciously all the letters of a given word or of a series of words, but only a few which constitute the essential elements, and which fall into the focus of attention. The great majority of the letters

are perceived by our mind only by virtue of the unification of the individual constituting elements present within the field of vision. A further proof of the above-mentioned process is given by the fact that in reading rapidly we easily overlook misprints, whereas a concentrated attention upon the individual letters would make us conscious of each error. Clearly, only very few letters are perceived at the moments of focussing the attention, the majority being perceived by virtue of apperception.

The analogy which we have just given will make clear what is meant by apperception in piano playing. If we concentrate our attention consciously upon each tone produced by us on the piano, we can produce only a relatively small number of tones in a given time.

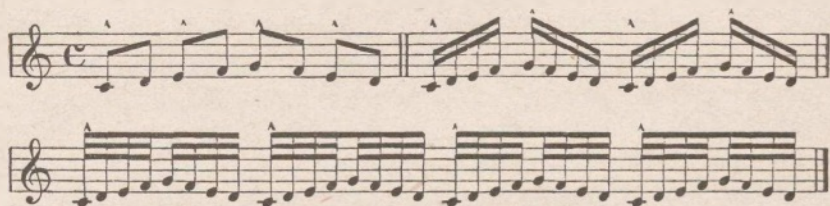
In apperceptive playing, on the other hand, our attention is not focussed upon each individual tone produced, but only upon a select few which fall into the focus of attention. The great majority of tones is reproduced only by virtue of the general unification in our mind of the entire subject matter present within the field of vision. The larger the number of tones which reach our mind by apperception, the larger the scope at our disposal for technical purposes. If we unite in our mind entire sets of bars or complete passages we are enabled to reproduce them on the piano with exceeding swiftness because our arm is governed by the p s y c h e, not vice versa. It is this that constitutes the capital importance of apperception in the development of velocity on the piano.

In a report read at a musical congress it was pointed out that the fingers of a pianist were capable of making as many as 2000 different movements per minute. This number is quite correct. If we remember the experiments of Raif discussed above, from which it was seen that in most rapid passages on the piano the number of strokes performed by the five fingers together in one second is twelve, and hence the number of strokes per second performed by our two hands, is twenty four ;

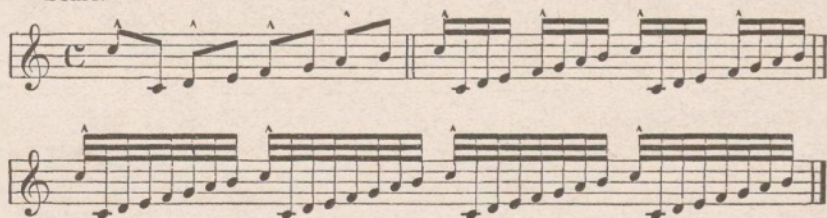
and if we remember that each stroke consists of two movements (lifting and lowering), it follows that the ten fingers together perform 48 movements per second. Multiplying by 60 we obtain the number of movements of the fingers per minute:  $48 \times 60 = 2880$ . This number of course represents the maximum, so that in general the above-mentioned number of 2000 per minute is evidently correct for average cases.

Clearly, the mind of a pianist cannot become conscious of each of these 2000 movements, and hence certain groups of movements are united by the faculty of apperception, by virtue of which alone such speeds can be realized. The following is a series of apperceptive model exercises:

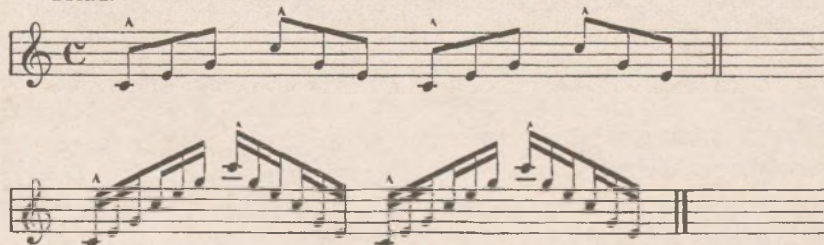
Five-Finger Model Exercise.



Scale.

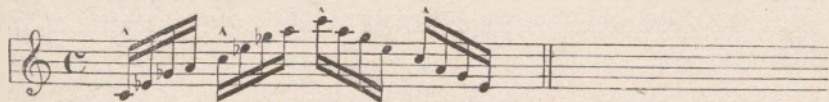


Triad.

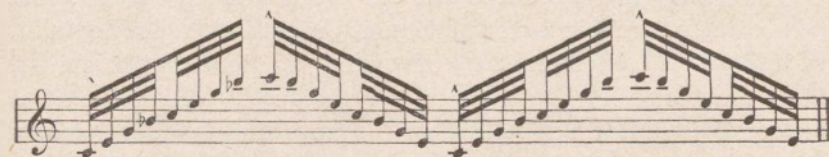




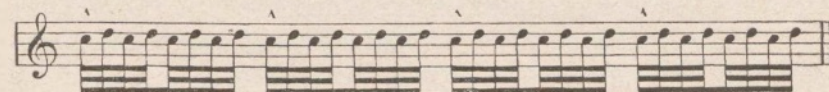
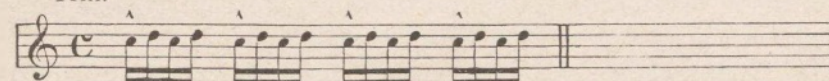
## Chord of the Diminished Seventh.



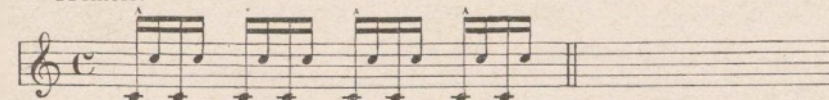
## Chord of the Dominant Seventh.



## Trill.



## Tremolo.



By combining in our consciousness the series of notes contained in one or more bars we apprehend them as a unit whole; in our consciousness we form certain "images of tones"

encompassing one or more bars. We may consider an example from the field of visual impressions by way of illustration: In observing any regular geometrical figure, e. g. a hexagon, we will endeavour to obtain a general impression, but never an impression of each constituent element; by obtaining the general impression we apprehend the figure as a whole. In exactly the same manner the bars or sets of bars must be apprehended as constituting unit wholes of which we have certain definite tonal impressions, or images. The only difference between the two is that in the case of vision the constituent parts of a figure are apprehended simultaneously, whereas the tonal images are apprehended successively. As our mental range of consciousness is limited, the number of impressions of tones that we are capable of apprehending is also necessarily limited.

Rhythm thus produces certain tonal images in the mind of the player, and at the same time it promotes the development of musical thinking, of which we shall speak in the next chapter.

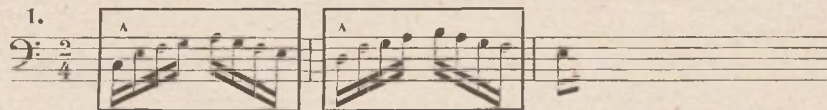
It is important to note that for appropriate apprehension of the tonal material we are concerned with, a certain system must be developed, by the aid of which we rapidly gain permanent images of the kind required.

Once these images have been formed, they can at any given time be quickly reproduced on the piano.

The mental acquisition of the musical material is of considerable importance for playing from memory and for the general development of our musical memory.

Examples of tonal images:

Hanon, Exercise No. 1.

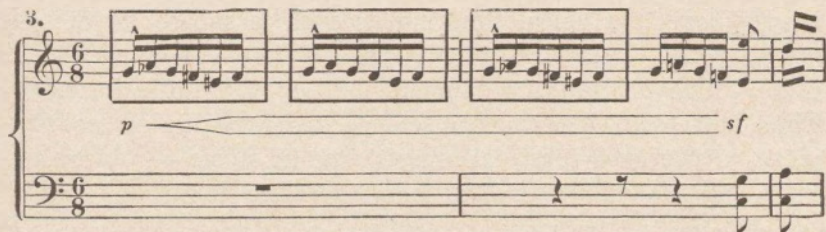


Hanon, Exercise No. 21.





## Mendelssohn, Song without Words, No. 34.



## Chopin, op. 28, No. 3. Prélude.



It will be clear from the preceding explications that not only pieces and studies, but all sorts of technical exercises, such as scales, arpeggios, tremolos, trills, chords, etc. should be carried out rhythmically, i. e. with accentuations at the commencement of the bars or of the rhythmic figures of the composition. [See also V. Safonoff, "Die neue Formel" (The New Formula)].

In conclusion, we wish to point out that rhythmic accentuation must correspond to the general tonal colouring of the composition to be played, i. e. the accentuation must be more strongly stressed in loud playing than in soft.

It is quite possible to play without any accentuation at all, namely, by focussing our attention upon focal points of consciousness which form the supports in the uniting of certain groups of tones.

This rhythm which is present only in the mind could be termed *psychical* and the rhythm manifesting itself in physical movements — *physical*.

## 2. Musical Thinking: its Concept, Significance, and Development.

"Musical Thinking" in piano playing consists in creating in the mind images of series of tones together with the



details of rhythm, tonal volume, beat, etc., without the aid of the keyboard. Musical thinking as such is subject to the general laws of thinking. The difference between musical and other kinds of thinking consists only in the subject matter. Thus objects of thinking in science are facts, in philosophy — ideas, in poetry — poetical images, and in music — tones; and hence musical thinking may also be called tonal thinking.

In full accordance with scientific or philosophical mode of thinking, musical or tonal thinking must also invariably precede its utterance. If a player wishes to produce certain tones, he must first form a clear image of them in his mind before reproducing them on the piano; in other words: the "tonal image" in the consciousness must precede the "image of the movements" in reproducing the sounds on the keyboard.

The capacity of "musical thinking" depends entirely on the intensity of our generating images and volitional impulses. Musical thinking is just as necessary while performing exercises as it is while giving a recital. The difference consists only in the quantity, in the scope of the "tonal image" that must be generated in each case. Exercises require a comparatively small or restricted tonal image to enable the player to reproduce them, while the recital of a piano concert requires the formation in our mind of a tonal image of the entire piece or composition to be played.

Musical thinking is of considerable importance for the development of piano-technique; it fosters the attainment of uniform and reliable technique, and increases velocity. To illustrate the significance of musical thinking for uniform and reliable playing we may draw a comparison with a public orator. The orator and the pianist pursue essentially the same object: that of demonstrating a train of thought. The means by which this is accomplished are the only thing that is different: the orator employs words to express his thoughts, while the pianist employs tones to reproduce his musical thoughts. If the orator is mentally ahead of what he is saying, his speech will be outwardly faultless, provided, of course, that he is

a master of speech, and is capable of expressing his thoughts in words without stammering or halting. If, however, the orator remains in thought behind his words, unforeseen intermissions will inevitably occur and the flood of speech will be interrupted. The same applies to musical thinking with respect to acquiring uniformity in materializing musical thoughts. If the pianist's thoughts precede the reproduction, he will know what actions to perform as soon as he has laid out a suitable plan of performance and has command of all the movements at the proper time. The execution of a pianist who thinks in musical images will, therefore, be uniform and faultless, whereas a pianist whose thought lacks musical images will be at a loss what to do at certain moments; he has no definite plan before his mental vision, and fails to command the proper material at the proper time. Hence his playing will be uneven and floundering.

Musical thinking is also of great importance in acquiring velocity. We know that the thoughts must precede the execution; accordingly, if we advance rapidly with our thoughts, we shall also be able to follow quickly with the fingers without losing the thread of the musical discourse. Conversely, if our thoughts lag behind the tones produced, we soon lose the train of ideas, and the result will necessarily be that the fingers flounder and stop notwithstanding their ability to carry out technical passages with ease and perfection. Accordingly, it is clear that in rapid playing rapid musical thinking is necessary for connected performance, and for governing the movements of the arms. Rapid playing is utterly impossible without rapid musical thinking, and no amount of exercising will help in this matter. Joseph Hofmann writes: "To be able to play rapidly one must be able to think rapidly. Slow work is no doubt the foundation for rapid playing; but rapid playing is not the immediate result of slow work. From time to time endeavours must be made to play rapidly, as this develops quick thinking." Joseph Hofmann recommends approaching the problem of attaining speed in two ways: "It is necessary from time to time to accelerate the speed of playing a given piece, until gradually, by will power, the

maximum speed has been attained; or, from time to time it should be tried to play rapidly without commencing slowly, even at the expense of accuracy, as this latter drawback can be compensated subsequently by returning to slow playing." "Slow playing is frequently nothing but the result of our general inertness. There is only one means to overcome this, and that is exercising of the will-power towards attainment of velocity of execution."

In order to develop musical thinking in pupils it is advisable to instruct them to sing the melody which is to be learned on the piano. By reproducing the melody vocally without the instrument his mind will generate a certain tonal image encompassing the given melody, i. e. he commences to think in musical images.

For the same purpose it will be necessary to request pupils to reproduce on the piano certain melodies with which they are acquainted, with or without accompaniment. In this case the pupil will reproduce on the keyboard the tonal image he has already formed, i. e. he will commence to interpret and to materialize musical thoughts.

It is also advisable for the development of musical thinking that the teacher plays pieces suited for the mental development of the pupil, at the same time asking him his opinion on the piece, as this will induce him to form complete tonal images. The pieces that have been played must be given as exercises to the pupil, and amongst them those he has most clearly perceived should be given the preference.

Thereupon the pupil should endeavour to learn to play the pieces from memory, as this will force him to be guided by tonal images, while, in playing by notes, he is only required to adhere to the guidance of the notes on the paper.

Rhythmic playing, i. e. playing with appropriate accentuation at the commencement of each bar or each rhythmical figure, conduces to the development of good musical thinking.

The same aim is pursued by hearing concerts. Every pianist knows the fact that pieces that have been heard in concerts are



technically mastered with much greater ease than compositions which are entirely unfamiliar. The explanation is clear: in the former case the pianist is able to form an adequate image of the musical ideas contained in the composition concerned, because the concert presented them to him in faultless fashion; in the latter case he must endeavour to form this image primarily from the notes on the music sheet. A clear conception of musical structures and compositions enables us to reproduce them on the piano much more readily.

Composers generally have a strongly developed capacity for musical thinking. One of the most amazing examples of musical thinking known in the history of music is that of Beethoven. It is well known that several of his most eminent compositions were written after he had become completely deaf. Without the faculty for controlling the sounds by the aid of his ear he was guided exclusively by the tonal images which he formed of everything he wrote.

### 3. Strengthening the Nervous System.

Psychical activity in piano playing is fostered by everything conducive to strengthening the nervous system. Nourishing food and physical exercise in the open air are essential factors; without them the most robust nervous system will eventually become shattered, and the ultimate result would be the cessation of all practising. Gymnastic exercises, bathing, walking, etc., are just as necessary for the pianist as trills and scales. As every one else, the pianist should of course not overdo such physical exercises to the extent of overtiring his physical faculties. The limit for such physical exercise, at which fatigue commences, is entirely dependent on the individual concerned. Technique is in no wise endangered by temporary interruption of practising; quite on the contrary such interruptions strengthen the nervous system, and after a rest the pupil will generally progress more satisfactorily than before, by reason of the fact that the quality of his work has been improved. Methods and means for strengthening the nervous

system will in many cases be governed by medical advice which should be sought, if necessary.

#### 4. Appropriate Division of Time in Practising.

Psychical activity is promoted by a proper division of time in practising. Josef Hofmann gives some good advice in this respect. Practising should be done in the early hours of the day, the hours of greatest mental activity and alertness, the time when the nervous system and the mind are refreshed by sleep. After every half hour of practising at least five minutes intermission should take place, as this will aid the mind in assimilating new impressions. After one or two hours, a walk should be undertaken, and all thoughts of music should be banished during this time. This is what Hofmann designates as "airing the mind", and he maintains that its significance lies in the fact that the result of the whole work performed is adequately consumed and received by the entire organism; the material that has been acquired by mental and physical labour must necessarily be fixed in the entire organism, in the same manner as a photographic image is fixed on a plate or film by the action of the fixing bath. As soon as the intrinsic interest in practising is seen to relax, or the capacity for focussing the attention upon the subject matter becomes dulled, work should cease altogether, regardless of the general division of practising time. The following order should be observed when practising: technical exercises should come first, then new compositions should be studied, and finally the material that has already been learned must be polished and finished down in order to turn technical into artistic accomplishment. In some instances in order to obtain new impressions it will be advisable to make another arrangement. It is best to commence with the items upon which primary energy and attention are to be expended. The maximum time for daily exercises should never exceed four hours, as too long playing not infrequently produces negative results; attention can only be concentrated

perfectly for a limited period, after which all further endeavours are entirely useless, and in most cases, injurious. The standard by which all work should be judged is quality and not quantity.

##### 5. Playing from Memory. Memory Types: Mechanical, Logical, Motoric, Visual, Auditory, and Indifferent Memories.

To promote psychical activity in piano playing is of utmost importance the learning to perform from memory. When playing by notes, our attention is directed to piano playing, as well as to the reading of the notes and fingering, notwithstanding the circumstance that the piece may have been played a considerable number of times before. When playing from memory there is no need to direct the attention to fingering and notes, and it can accordingly be concentrated exclusively on the playing.

When playing by notes, the player generally experience difficulties in forming the tonal image, being disturbed by the impressions of the eye; the visual images in the form of notes on the paper still continue to guide him. Playing from memory, however, enables the player to proceed according to the guidance of the tonal images by virtue of which is developed and fostered the increased musical thinking. Finally, in playing by notes we are dependent on them, and therefore as a rule we have only very slight artistic experience during the performance; in playing from memory the tonal image is constantly before our mental vision, thus enabling us to experience artistic emotions. The old adage: „tantum scimus, quantum memoria tenemus”, contains most valuable truths, because it states that we know just as much as we are capable of keeping in our memory; in other words, if we remember nothing we cannot know anything.

Practice has proved beyond doubt that playing from memory ensures better performance and greater velocity than the playing by notes.

It seems clear, therefore, that from the very commencement



endeavours should be made to play everything from memory. It is much more advantageous to play less, but from memory, than to play by notes a large number of compositions, only to discard them again without having attained the ultimate aim. Reading of notes is a study by itself which is independent of technical exercises and the artistic performance of concert pieces.

Owing to the immense practical importance of playing from memory we consider it well worth our while to dwell a little longer on this subject.

According to the doctrines of psychology, memory is not a single property common to all human beings that may vary in quantitative or qualitative respect, but there are several distinctly different kinds of memory. The following subdivisions of memory are to be distinguished: on one hand the two general species, viz. the mechanical and the logical memories, on the other hand the special kinds: motoric, visual, auditory, and indifferent memories.

Mechanical memory in piano playing may be designated to be the accidental retention in the mind of various combinations, such as: the succession of sounds (melody and accompaniment), the movements of the hands and fingers, the location of the keys on the keyboard, and the corresponding notes. The characteristic of the mechanical memory is the accidental element; there is no consciousness present, and this constitutes the draw-back concerning the mechanical memory in piano playing. Pianists employing this faculty of their memory invariably risk losing the train of thought while playing, and indeed, in nearly all such cases it has been found that floundering and unevenness occur in almost every bar. Although the mechanical memory is to a certain restricted degree invariably employed in piano playing, the conscious method should nevertheless be given the preference; it must gradually displace the mechanical memory, and eventually this will actually be the case. It is a well-known fact that the mechanical memory decreases in significance and is displaced by the logical or conscious memory the more readily the greater the intellectual development.

Logical memory in piano playing consists in conscious

and systematical remembering of the same variety of combinations to which we alluded above in defining mechanical memory. By the aid of the logical memory, all that can be heard, sensed, and seen, is carefully analysed, systematically ordered and connected with previous consciously acquired material. The more firmly the subject matter to be learned is intrinsically connected by a logical system, the more firmly it is associated with the remaining contents of our consciousness, the more readily it will be apprehended and retained. To facilitate thorough and efficient memorizing by the aid of the logical memory piano pedagogy recommends the study of the theory of music, in particular the theory of harmony and of musical forms, which makes the student familiar with the melody and the system of accompaniment simultaneously with the structure of the entire composition and of its constituent parts. The presence of a logical memory with a student is most manifest in his critical attitude towards everything discovered in a given composition, which again is evident from consultations of competent authorities, the reading of books and attempts at solving given problems from various points of view. We now proceed to consider the various special types of memory.

The motoric memory (memory for motoric sensations) in piano playing consists in memorizing certain sensations in the arms and its parts. These sensations are experienced in various styles of technical execution. The two fundamental sensations perceived are those caused by the active and the passive states of the arms. These two fundamental states of the arms unite in varying degrees to form mixed sensations which in turn vary in intensity.

Motoric memory is of cardinal importance for piano playing. By virtue of their motoric memory the pianists are capable of finding and striking the correct keys with exceeding facility, and of adopting all kinds of necessary positions of the arm and its parts. Everything with which we shall be concerned in the following part ("Mechanics of Technique"), namely the acquisition of the correct sensations required for various styles of technical execution, is related to the motoric memory. Rapid

and thorough memorizing by the aid of the motoric memory is materially promoted by acquainting the student with the various styles of technical performance in conjunction with the corresponding sensations experienced in the arms.

The acquisition of the special sensations in the arms by means of the motoric memory is fostered particularly by the adoption of a systematic fingering. To achieve success in exercising and practising it is necessary to mark a certain fingering on the music sheets, and to retain this fingering without any deviation whatsoever, in order to develop the corresponding sensations in the arms. If the fingering is changed, a new sensation is invariably created in the arm, and this is naturally misleading in playing from memory. Sometimes, in playing complicated passages it is impossible to mark a certain system of fingering on the music sheets, but in such cases it is advisable to play through the passages in rapid succession several times, allowing oneself to be guided exclusively by natural instinct; if a suitable fingering system has thus been acquired, it should be retained once for all. In the part treating of the acquisition of different styles of technical execution we shall enumerate the rules governing systematic fingering, as they are generally employed in practice.

The memory of sensations of touch is intimately related to the motoric memory. By this we mean the memorizing of certain kinds of sensations experienced when the fingers touch the keys (*sensation of keys*).

A criterion for the presence of motoric memory in students is the sure and uniform playing of passages. The motoric memory effectively prevents intermissions in playing rapid passages; unclear performance may be due to many other causes, but in each special case the passages will be easily performed by virtue of the motoric memory. This type of memory in conjunction with the memory for touch sensations is generally strongly developed in blind musicians. One of the most striking examples of this type of memory is that of the blind violinist and pianist in Moscow (Vladimir Beljaeff).



The visual memory in piano playing is directed towards the memorizing of the location of the notes on the music sheets, and of the corresponding keys on the keyboard. It must be remembered in connection with this kind of memory that the pupil does not form by its aid a tonal image of the entire composition, which is primarily of an acoustic nature, but the image of the music text. The visual memory plays only a secondary rôle in piano playing; this is manifest from the fact that music is intended primarily for the sense of hearing, and not for the sense of sight. The development of this type of memory depends primarily on the degree of attention devoted to learning a composition. In order to test whether a student is endowed with a visual memory let him pick out some special passages from the notes which he has just been playing; if he finds them quickly it is clear that the visual memory plays a considerable part in his case; conversely, if the student fails to find the places in the music text, he is not guided essentially by his visual memory.

The auditory memory in piano playing consists in the retention of series of sounds by the aid of the sense of hearing. This series of sounds may consist either of the melody alone, or of the melody with its accompaniment, or of the entire musical composition as a whole. The memory of hearing, or the auditory memory, is particularly developed in persons highly gifted in music; hence this memory is frequently termed also musical memory. The auditory memory is of capital importance in music, because music is primarily intended for the sense of hearing. In intimate connection therewith is the faculty of musical thinking. If we recall that musical thinking consists in the reproduction of a series of tones without reference to the keyboard, and that the objects of musical thinking are sounds, it will become clear that the auditory memory represents an essential support for our images of sounds or tones; in other words: without auditory memory musical thinking would be impossible. Without musical thinking, again, musical performance or creative activity in music, would be impossible.

In view of the significance of the auditory memory for

music it is essential to develop this faculty more than all the others. Everything that has been recommended here for the development and promotion of musical thinking, generally, everything that fosters the development of the sense of hearing, applies equally to the development of the faculty which has been called the auditory memory, namely: singing by ear, playing of melodies on the keyboard by ear, musical dictation, solfeggio, participation in choirs and orchestra-playing, etc.; at the same time everything should be avoided which might impede the development of the sense of hearing, such as playing on a mute piano, or on a poor instrument, too loud playing, playing with the metronome (see page 123).

The auditory memory commences to develop in human beings at the earliest stages of childhood, long before any instruments have been touched. The criterion for the effectiveness of auditory memory is the capability of singing correctly by ear, and of finding melodies on the piano by ear, without previous study. The sense of hearing and the auditory memory should be developed long before any piano lessons are commenced. There is no necessity to employ a piano for this purpose, — this is of importance for those who have no piano in their homes, and for those whose hands are too small, so that the technical exercises for them would be injurious. Technical exercises on the piano should not be commenced until the pupils have reached the stage where they are positively conscious of their activities, which is seldom the case before they have reached their seventh or eighth year. The sense of hearing, and the musical memory, however, may be developed much earlier, in fact, it may be commenced as early as in the third year [cf. Maikapar, "Das musikalische Gehör" (The Musical Ear), Moscow 1900].

Nearly all the types of memory we have mentioned find some application in piano playing; the majority of the players employ them all to a greater or lesser degree. A memory which is not distinctly developed in the direction of any of the aforementioned special kinds of memories is called a *mixed or indifferent* memory. We must mention, however, that musically

gifted persons are endowed with a particularly keen sense of hearing, and the more intellectual amongst those, also with a logical memory. Moreover, the piano-virtuosi are endowed with an especially strongly developed motoric memory, while the visual memory only plays a secondary rôle in piano playing, and the mechanical memory should be replaced as speedily as possible by the logical memory.

We know from psychology that the natural psycho-physical conditions of the different kinds of memory cannot be altered, and hence no amount of practising of any kind whatsoever can possibly increase their strength. If, e. g., nature has endowed a human being with a good sense of sight, but with a poor sense of hearing, no exercising will ever conduce to make that human being remember tones. Practising and exercising may only improve the methods adopted for memorizing the subject-matter, but this is all. If, therefore, the teacher has discovered the kind of memory to which the student gives the preference, he must devise certain practical methods pertaining to the kind of memory in question, by the aid of which the pupil will best be able to memorize the material he is concerned with.

It is essential to plan out systematic practical methods for all the kinds of memory, so that, in case one kind of memory should fail for unforeseen reasons, the others may prevent interruptions in performance, though of course they cannot adequately replace the failing element.

All the means which we have hinted at above, as applied to the various kinds of memory, are those methods: for logical memory, — the study of the theory of music; for motoric memory, — the familiarity with the various kinds of technical styles in conjunction with the physical sensations in the arms and fingers; systematically worked-out, or instinctively acquired fingering; for auditory memory, — everything promoting the development of the musical sense of hearing, and elimination of everything impeding such development.

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## PART II

# MECHANICS OF TECHNIQUE

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### I. THE ANATOMICAL STRUCTURE AND THE MOVEMENTS OF THE ARMS. PHYSIOLOGICAL PROPERTIES OF THE MUSCLES

Anatomy distinguishes the following parts of the arm:

1. The Fingers. They form the extremities of the arm; each finger excepting the thumb has three joints, while the thumb has only two.
2. The Hand. This is the part of the arm comprising the fingers, the metacarpus, and the wrist or carpus. The metacarpus consists of five long bones joined to the lower ends of the fingers; the wrist consists of a group of small bones connected to the forearm.
3. The Forearm. This is the part of the arm between the wrist and the elbow.
4. The Upper Arm is the part of the arm which extends from the elbow to the shoulder (see fig. 1).

The structure of the parts of the arm as enumerated above is such that a certain number of movements in various directions can be performed. These different kinds of movements are 1. Stretching and Bending, 2. Adduction and Abduction, 3. Rotation.

All the three kinds of movements can be performed in the shoulder joint.

The elbow joint permits of two kinds of movements:

1. stretching and bending,
2. rotation;

the wrist of two: 1. stretching and bending, 2. adduction and abduction;

the knuckles of two: 1. stretching and bending, 2. adduction and abduction;

the other joints of the fingers of one: stretching and bending.

All these movements of the arm are required for piano playing, as we shall see further; each one of them should

be employed only for certain definite purpose, and none should be wasted or expended uselessly (cf. part II, chapter VI, 2).

The different parts of the arm which are movable in all their joints, represent a series of levers, each of which is supported by the others. In order to move these sets of levers a certain force must be exerted upon them. The seat of this force is located in the muscular system with which the skeleton is covered. The function of the muscles in moving the arm consists in contraction (tension).

Contraction shortens and thickens the muscles, and at the

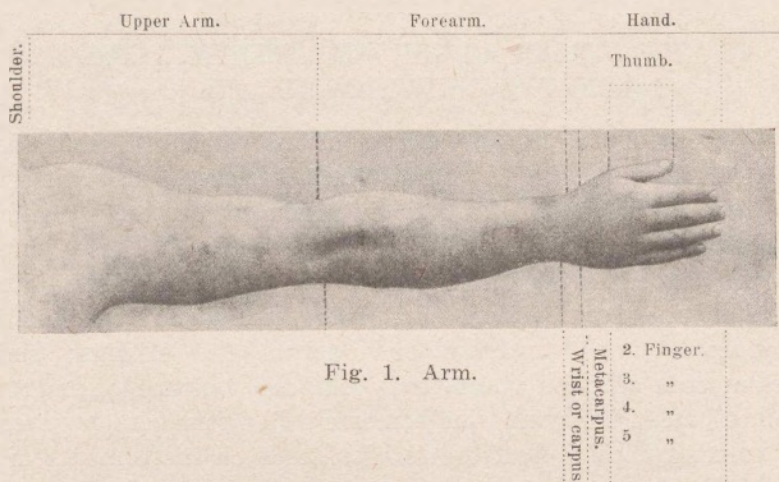


Fig. 1. Arm.

same time makes them harder; the converse action, relaxation, lengthens the muscles out making them thinner and softer.

When contracted, the muscles are said to be in the active state; when relaxed, — in the passive state. In piano playing complete passiveness of the muscles can never take place. A certain, very slight action of the muscles is necessary, e. g. to hold the hand on the keyboard; without this muscular activity the hand would glide off the keys. Hence, in using the term "passive state", applied to piano playing, we imply only relaxation of the muscles, but not complete inactivity.

In piano playing we must as frequently as possible allow the muscles to return to the passive state, because constant tension

would soon tire them out unnecessarily; the active and passive states of the muscles should constantly alternate, as this enhances endurance. This also explains why it is easier to walk for a long time than to stand still on one spot for the same length of time: in walking certain sets of muscles alternate one with another in tension and relaxation, when standing still certain muscles are kept under a constant tension. For the same reason a person who is capable of working all day with his arms is scarcely able to hold up his extended arm for a few minutes.

## II. THE STROKE AS THE FUNDAMENTAL FORM OF TONE-PRODUCTION ON THE PIANO

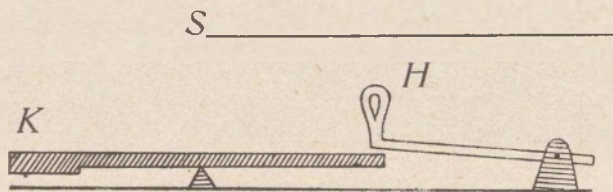
The theory of music (science of instruments) subdivides musical instruments into three distinct classes, according to the manner in which the tone is produced on them, which depends essentially upon their construction. These three classes are: string instruments, wind instruments, and instruments of percussion. On string instruments the tone is produced by passing the bow across the strings; such instruments are, the violin, the viola, the violoncello, and the counterbass. On wind instruments the tone is produced by causing a column of air to vibrate; such instruments are, the flute, clarinet, bassoon, organ. On percussion instruments the tone is produced by the stroke of a hammer on the object to be set into vibration; the piano belongs to this category of instruments, because the tone is produced by means of a small hammer which strikes a string (see figs. 2 & 3). We see, therefore, that stroke is the characteristic means of producing sounds on a piano in accordance with the construction of this instrument.

In piano playing we understand the term "stroke" as denoting a certain movement in which the arm is raised and lowered by the aid of muscular contraction. The tension of the muscles on the one hand, and the raising and lowering of the mass of the arm on the other, are intimately related; in fact their



relationship is similar to that of cause and effect; the tension of the muscles is the cause, the raising and lowering of the arm the effect. Physiologically speaking, the stroke represents an alternating tension of the extensors and of the flexors of certain sets of the digital, hand, forearm, upper-arm, and shoulder muscles.

If we consider the parts of the arm with reference to their fixed points of motion as levers, we may distinguish four



S = String, H = Hammer, K = Key.

Fig. 2. Position of the hammer before the stroke.

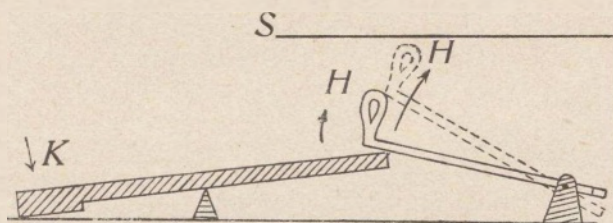


Fig. 3. Position of the hammer after the stroke.

different kinds of strokes in piano playing: the finger, hand, forearm, and upper-arm strokes respectively (see figs. 4, 5, 6, 7). The distinguishing characteristic of these kinds of strokes lies in their striking mass; in each case the arm, or a part of the arm, operates like a striking hammer.

Though each of the finger joints between the phalanges represents in a certain sense a fulcrum, the striking mass of the finger phalanges is so slight, and the flexibility of the finger joints between the phalanges so small, that the finger phalanges are not considered as independent striking mass in piano

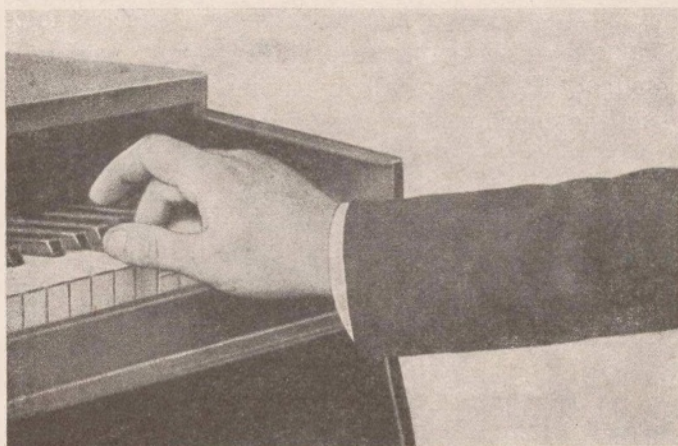


Fig. 4. Finger Stroke.



Fig. 5. Hand Stroke.

playing. We now proceed to consider the fundamental problems connected with stroke.

Each kind of stroke and each of the fingers, generally speaking, may only claim a certain limited height to which they are raised in playing the piano. This height depends on the anatomical structure of the parts of the arm and fingers.

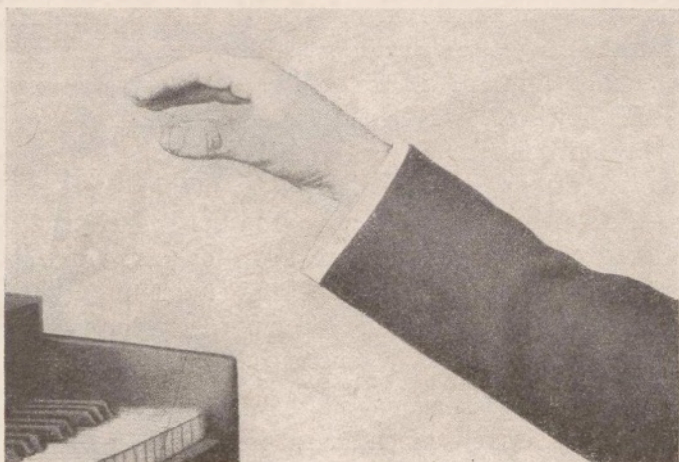


Fig. 6. Forearm Stroke.



Fig. 7. Upper-Arm Stroke.

In particular the second finger is always lifted higher than the others; the fourth finger is raised less than any other, and



the first, third, and fifth fingers occupy an intermediate position in this range. Accordingly, all exercises designed to achieve equal height of stroke of each finger are entirely useless. If, however, we consider that the digital extensors possess but little strength, it will be admitted that every endeavour to strengthen the fingers by lifting them as high as possible is injurious; in fact, quite the contrary results are achieved, because the fingers are not strengthened but overstrained and weakened; hence in performing the finger strokes, the fingers should be lifted only a minimum distance, which entails no unnecessary tension of the muscles.

Just as the fingers should not be raised excessively high to prevent unnecessary expenditure of energy and straining, the hand should only be raised as little as possible. Excessive lifting of the hand frequently causes pains in the wrist by reason of the comparative weakness of the connecting muscles between the hand and the forearm.

High lifting of the forearm or upper arm is far less dangerous, because the anatomical conditions under which these parts of the arm operate are more favourable.

The maximum lifting heights such as shown by figs. 4—7 should be employed only in performing slow exercises designed to impress upon the brain the particular sensations which it is desirable to become familiar with. When playing rapidly, the stroke must be performed with as little raising of the parts of the arm as possible, in order to economize as much as possible energy of motion and time. This we shall discuss in a more detailed way at a later stage (cf. part. II, chapter VIII, page 116).

It is known from physiology that short and rapid muscular contractions yield maxima of force. Hence, to produce a strong tone, decisive and rapid movements must be performed; under no circumstances dull or slow movements. A decisive factor in producing tones is involved in the moment at which the striking mass touches the keys; the tenser the muscles at this moment, the stronger the tones will be, and conversely, the

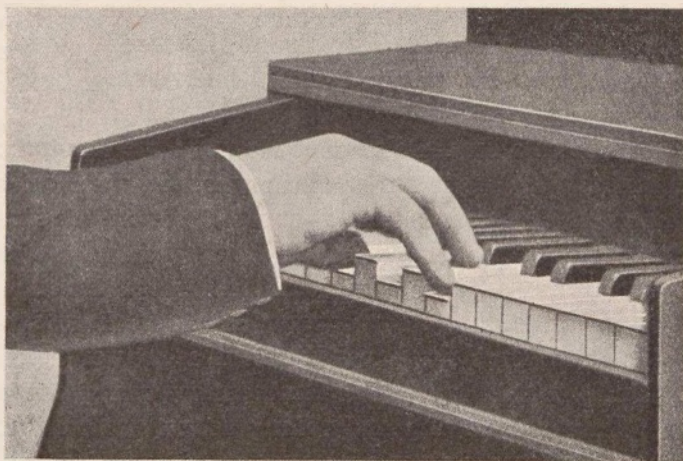


Fig. 8. Perpendicular direction of the stroke.

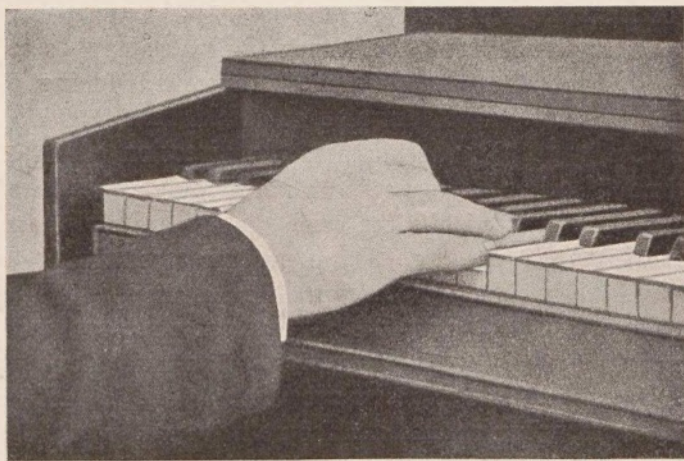


Fig. 9. Oblique direction of the stroke.

weaker the tension at this moment, the softer the tones will be. The period of maximum tension must be made as brief as possible in order to avoid superfluous expenditure of energy.

The force of the stroke depends to a considerable degree upon the physical properties of the performer's hands. Naturally



massive hands endowed with sufficient muscular strength are more capable of producing strong and powerful tones than hands which are by nature slight, and which have little muscular power.

The force of a stroke also depends upon the amount of the striking mass; the finger stroke is the weakest, the hand stroke is stronger, the forearm and upper-arm strokes are the strongest that can be produced. Each finger is endowed with a special innate strength, and hence it would be useless to endeavour to make all fingers equally strong; in fact, it is even injurious as it requires the expenditure of a greater amount of energy, and the result may be unnecessary tiring out of the fingers. Weighted playing and rolling action are conducive to achieving a uniformly strong production of tones (cf. part II, chapter III, 1 & 2).

We know from the theory of mechanics that the greatest force of a stroke is effected if the force is directed perpendicularly against the object to be struck. This also applies to piano playing. Although the movements performed during playing the piano are not carried out along straight lines, but in certain curves (see page 93), the plane of the direction of the strokes should nevertheless always remain perpendicular to the surface of the keyboard. If this is the case, the fingers strike the keys with their tips (see fig. 8), excepting the thumb, which strikes with its side; if, however, the direction of the stroke is oblique with respect to the surface of the keyboard, the fingers fail to strike with their tips, but strike the keys with their sides (see fig. 9), the consequence of which is that the striking mass, being deprived of its point of support, glides, and the force of the stroke is thereby diminished. During the performance a perpendicular direction of the force of the strokes is facilitated by keeping the arm in the extreme position of pronation (see part II, chapter III, 2).

As stated above, we distinguish four different kinds of strokes, corresponding to the four chief parts of the arm; the striking mass is characteristic of each of these strokes. To achieve a clear and strong tone it is necessary to fix



the striking mass corresponding to the different kinds of strokes. This "f i x a t i o n" of the striking mass consists in making, with the minimum of physical exertion, the striking mass compact, and in eliminating all superfluous movements and waverings in raising and lowering the parts of the arm. A striking mass which permits of any superfluous movements or waverings that were not intended resembles a broken hammer which cannot be used to perform a clear and decisive stroke. We proceed to discuss the different kinds of strokes.

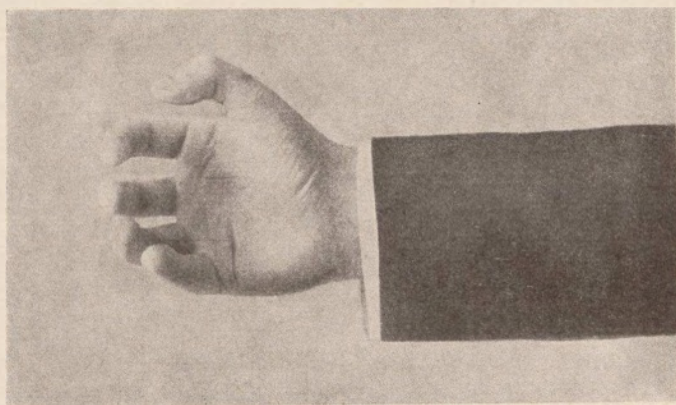


Fig. 10. Concave setting of the hand.

In the finger stroke the striking mass consists of the fingers, each of which, excepting the thumb, has three joints, the nail-joint, the middle joint, and the knuckle joint. It is necessary in that case firmly to fix all the three joints so that the movement is performed essentially by means of the knuckle joint. In the thumb stroke the thumb and the metacarpal bone participate, the thumb consisting only of two joints, the nail-joint and the knuckle joint. In performing the thumb stroke, all the joints are fixed, i. e. the two finger joints and the metacarpal bone form one rigid whole; the movement is essentially performed by the joint at the wrist. It should be observed that the fingers should be fixed as firmly as possible in all strokes, because

the fingers bear the mass of all the four kinds of strokes, and because the fixation of the fingers requires by far the longest time, as compared with the fixation of the other parts of the arm.

The striking mass of the hand stroke is the mass of the arm from the tips of the fingers to the wrist; the fixation consists in the fixation of all the joints in the hand, the movement being restricted to the wrist only.

The striking mass of the forearm stroke is the mass of the hand and the forearm; the fixation consists in the fixation of the forearm as well as of the entire hand, the movement taking place exclusively in the elbow-joint.

In the upper arm stroke the striking mass consists of the mass of the entire arm from the tips of the fingers to the shoulder; the entire arm must be fixed and the movement restricted exclusively to the shoulder joint.

To fix the striking mass for all the different kinds of strokes it is necessary above all to hold the hand in a concave setting as indicated by figure 10; the sensation in the hand must at the same time be that of holding a spherical object within its hollow. According to the general rule the thumb must also be bent inwards, just as the other fingers. When the hand is held in this manner the bottom of the depressed key is generally reached without any difficulty, and thus the fingers are afforded the necessary support while playing. If the fingers are kept stretched out, this support is removed, and much energy is, therefore, uselessly expended for holding down the keys, not to mention the unclear and faulty playing caused thereby.

To facilitate the fixation of the striking mass for performing the various kinds of strokes it is advisable to perform chord exercises in the manner described in part II, chapter V, 2.

Finally, at the end of this chapter, some exercises are given, all of which promote practising the fixation of the striking mass.

As stated above, during the performance of the strokes on the piano, i. e. while the parts of the arms are raised and

lowered, the respective muscles are in a state of activity, and they should attain the point of maximum tension at the very moment when the keys are struck. After the keys have been touched, i. e. after the stroke, an active state of the muscles can have no positive effect on the strokes performed. Pressing the keys after the tone has been produced is a useless waste of force, particularly of finger force, as the tone cannot be changed thereby; the superfluous pressing of the keys is generally made manifest by the yielding of the finger joints, which are the points of least resistance. Pressing of the keys must altogether be designated as one of the most vicious habits that can be indulged in when playing the piano. Hence, after the stroke, the active state of the muscles, though it cannot cease entirely, must relax but only to such an extent that the keys are still kept depressed, i. e. to prevent the tones from disappearing.

To achieve this, the student must learn to develop his capacity of feeling the surface of the keyboard. Let the fingers glide lightly, without pressure, on the surface of any object, say, on a table or on the cover of the piano, and later on the keyboard may be taken, but care should be exercised not to produce a sound. In the incipency the fingers may also be caused to glide over the surface when flatly stretched out, in order to enlarge the surface area which is touched; later on, however, the fingers should be bent and touch the surface with the tips. The sense of feeling the surface of the keyboard thus developed will enable the student to strike tones without producing superfluous pressure afterwards, and at the same time the keys will not be allowed to rise after being depressed. The result will, therefore, be a minimum expenditure of physical energy.

To control the degree of pressure on the keys after striking them, let the teacher carefully lift the key touched and kept depressed by the pupil; the smaller the pressure exercised upon the key by the latter, the easier it will be to lift the key, and conversely, the more pressure the pupil exercises upon the keys after striking them, the more difficult it will be for the teacher to lift them.



All the different types of strokes produce sounds which are clearly defined as such, but which are nevertheless always to a certain degree abrupt, this depending largely upon the length of time the keys are held down after striking; that is to say, the shorter the time during which the keys are kept depressed, the more abrupt the sounds will appear, and conversely, the longer the keys are kept depressed, the longer the tones will be. But even if the keys are kept depressed as long as possible, a certain degree of abruptness will adhere to the tones. Increased coherency of the tones in piano playing (legato playing) may only be achieved by means of what is termed "weighted playing", with which we shall be concerned later on (cf. part. II, chapter III, 1.).

The finger stroke is applicable: 1) in legato playing combined with the weight of the arm (part II, chapter III, 1), and 2) in staccato playing, when the fingers touch the keys for such a brief time that they seem to spring or rebound from the keyboard immediately after striking; this is called the finger-staccato.

A special case in which the finger strokes are employed is in the playing of repetitions, i. e. in the repeating of one and the same note with different, in particular adjoining, fingers; all the repetitions may be carried out legato as well as staccato.

The hand stroke is employed 1) in staccato playing of double notes (thirds, sixths, and octaves), — on legato-playing of double notes see, however, part II, chapter V, 1. —; 2) in place of the finger staccato, with a view to obtaining greater strength of tone which is increased by reason of the fact that the striking mass of the hand stroke is greater than that of the finger stroke, as explained above, but it will have to be borne in mind that this increased strength is obtained at the expense of speed.

The forearm and upper-arm strokes occur:  
1) whenever the arms are removed from the piano and replaced

there, namely, before and after each pause or rest, before the commencement and at the end of each piece, and finally in the transfer movements of the arms from one part of the keyboard to another (see part II, chapter IV, 2); 2) to replace the hand stroke for the purpose of producing a greater strength of tone, which is possible owing to the fact that the striking masses of the forearm and upper-arm strokes are greater than those of the hand-stroke; 3) in portamento and martellato playing. The difference between the forearm stroke and the upper-arm stroke is only in strength by reason of the difference between the striking masses of the respective strokes. The forearm stroke enables the player to play more rapidly than the upper-arm stroke, and the tone strength achieved with the latter is at the expense of speed.

In the following we point out a number of exercises designed to develop the different kinds of strokes and the fixation of the corresponding striking mass.

It must be mentioned at this point that all the exercises are only to be understood as examples indicating the general nature of exercises to be selected by the student or the teacher for these special purposes; conscientious attention to such exercises will improve the understanding of the essentials of the various technical styles to be acquired. Moreover, at a suitable place we shall indicate a number of works that may be studied, and which contain appropriate practising material arranged according to the degree of difficulty.

**The Finger Stroke:** To develop this stroke it is recommendable to strike one and the same key repeatedly with the same finger. In order to eliminate the unnecessary waverings and swayings of the arms and the finger joints, such exercises should in the incipency be performed with one sustained note as point of support; the fingers which are not active during such exercising should by volitional impulses be made to retain as far as possible their natural position, i. e. they should be kept bent properly.

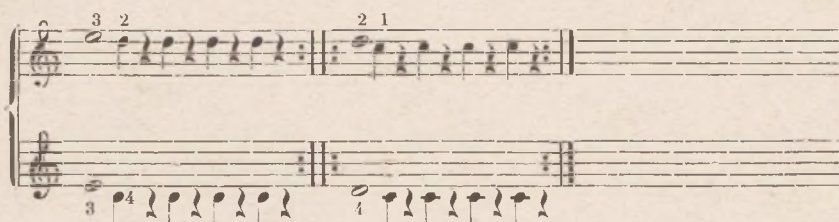
## Model Exercises.

Count: "One (= lower the finger), two (= raise the finger)"; M.M.  $\text{♩} = 60$ .

The musical score consists of five systems, each with a treble and bass staff. The exercises are as follows:

- System 1:** Treble staff starts with a 5. The first measure has fingerings 1 2 2 2 2. The second measure has 1 3 3 3 3. The third measure has 1 4 4 4 4. The bass staff has fingerings 5 4 4 4 4, 5 3 3 3 3, and 5 2 2 2 2. A count "Count: 1 2 1 2 1 2 1 2" is written below the first measure.
- System 2:** Treble staff has fingerings 1 5 5 5 5, 5 4, and 5 1. The bass staff has fingerings 5 1 1 1 1, 1 2, and 1 3.
- System 3:** Treble staff has fingerings 5 2 and 5 1. The bass staff has fingerings 1 and 1.
- System 4:** Treble staff has fingerings 1 2, 2 3, and 3 4. The bass staff has fingerings 5 4, 4 3, and 3 2.
- System 5:** Treble staff has fingerings 4 5, 5 4, and 4 3. The bass staff has fingerings 2 1, 1 2, and 2 3.





When several fingers execute a series of consecutive strokes, the following finger must be lowered simultaneously with the raising of the preceding finger. The observation of this rule during the first lessons materially facilitates the acquisition of strict alternation of fingers, which is conducive to an ultimately clear performance. In rapid playing, however, the fingers will instinctively rise much sooner than at the indicated moment, in order to be prepared to perform the further strokes.

### Model Exercises.

7.

4 5  
3 4  
2 1  
1 2 1 2

1 4 5 4  
2 3 4 1  
1 2 3 2

1 2 3 4 5 4 3 2

2 1 2 1  
3 2  
4 3  
5 4

3 2 1 2  
4 3 2 3  
5 4 3 4

5 4 3 2 1 2 3 4

8.

3 5  
2 4  
1 3

2 4 3 5  
1 3 2 4

5 3 4 2  
4 2 3 1

3 1 3 1  
4 2  
5 3

4 2 3 1  
5 3 4 2

1 3 2 4  
2 4 3 5



The model exercises here given encompass a fifth, and they should be performed in various tonalities, whereby every possible combination of white and black keys will eventually be obtained. Analogous exercises may be found in the following works:

Schmitt, op. 16, Exercises.

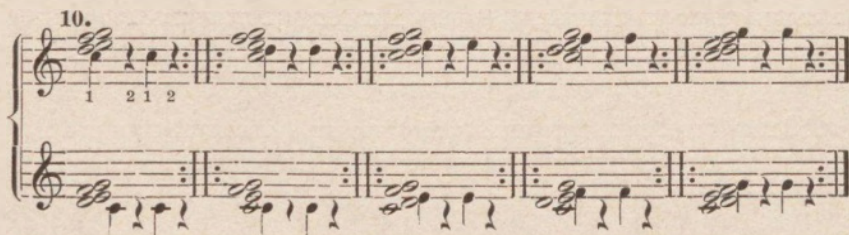
Hanon, *The Piano Virtuoso*, Nos. 1—31.

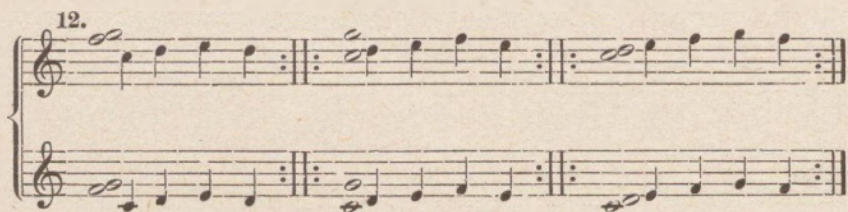
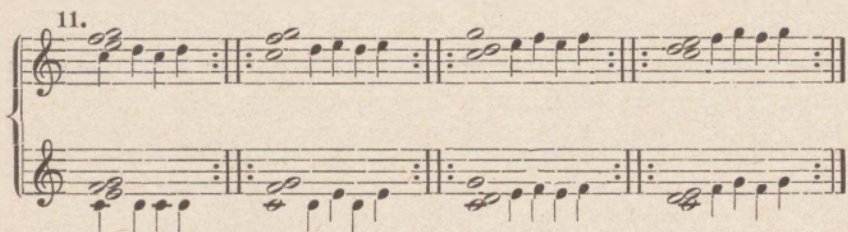
Lütschg, *Die Technik des Klavierspiels* (*The Technique of Piano Playing*), parts I & II.

Goedicke, 50 Exercises.

The following exercises will further develop the finger muscles in the now more secure hand; several sustained notes occur in these.

Model Exercises.





Further Exercises: Pišna, Exercices progressifs.

The exercises with several sustained notes should not be begun until all the fundamental technical styles of execution have been acquired. For the neophyte it will be difficult to hold down several keys with the non-striking fingers. These fingers must keep the sustained notes without sounding, i. e. they must keep the corresponding keys depressed with minimum pressure, which is achievable by a well developed sense of touch (see page 53). As long as this sense is little developed, the student will tend to exercise superfluous pressure upon the keys with the non-striking fingers, thus wasting his energy uselessly, not to mention the injurious ultimate effect of acquiring the habit of pressing down the keys with too great a force, which we alluded to above. Moreover, if the pupil keeps these fingers on the indicated keys, he will soon acquire an isolated finger



technique with all its drawbacks and faults, whereas, as we shall see later on, modern piano pedagogy has a tendency to discard all kinds of isolated finger technique.

Model Exercises for repetitions (repeated notes):

14.  $\begin{matrix} 5 & 4 \\ 4 & 3 \\ 3 & 2 \end{matrix}$   $\begin{matrix} 2 & 1 & 2 & 1 \end{matrix}$

etc. etc.

$\begin{matrix} 2 & 1 & 2 & 1 \\ 3 & 2 \\ 4 & 3 \\ 5 & 4 \end{matrix}$   $\begin{matrix} 2 & 1 & 2 & 1 \\ 2 & 1 \\ 3 & 2 \\ 4 & 3 \\ 5 & 4 \end{matrix}$

15.  $\begin{matrix} 3 & 2 & 1 & 3 & 2 & 1 \end{matrix}$

etc.

$\begin{matrix} 3 & 2 & 1 & 3 & 2 & 1 \end{matrix}$

etc.

$\begin{matrix} 3 & 2 & 1 & 3 & 2 & 1 \end{matrix}$

16.  $\begin{matrix} 4 & 3 & 2 & 1 & 4 & 3 & 2 & 1 \end{matrix}$

etc.

$\begin{matrix} 4 & 3 & 2 & 1 & 4 & 3 & 2 & 1 \end{matrix}$



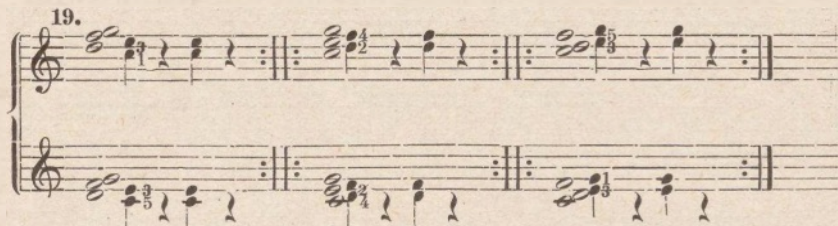
Further Exercises: Plaidy, Technical Studies, chap. IV.

After the strokes with separate fingers have been mastered the study of simultaneous action of two fingers, particularly in thirds, must be taken up.

Model Exercises:



Similarly with sustained notes:



Further Exercises:

Nikolaiewsky, Grand School of Double Notes.

Moszkowsky, Op. 64. School of Double Notes.

### **Studies and Pieces for the Finger Stroke.**

#### **1. In Legato Playing (Weighted Playing).**

Behr, Op. 575, No. 2. In May.

Trojelli, Coucou... le voilà!

Baumfelder, Op. 215, Ditty.

Fröhlich, Promenade au jardin.

—, Hungarian Dance.

Fröhlich, Scandinavian Romance.

Behr, Morning Song.

Schumann, Op. 68 No. 1, 3, 5. Melody, Short Piece,  
Trilling Song.

Behr, Op. 23. Sailor's Song.

Gurlitt, Op. 74 No. 4. The Poor Child.

Miklaschewsky, The little Bird.

—, Petite Barcarolle.

Carpentier, Consolation.

Schmitt, Op. 243 No. 3. Andante.

Spindler, Op. 249 No. 7. Berceuse.

C. Frank, Dolly's Complaint.

Mayer, Op. 340 No. 2. Two little Pieces.

Schumann, Op. 68 No. 16. First Loss.

Beethoven, Sonatina G-major.

Glinka-Gill, The Lark.



- Schmitt, Rondo on a Theme by Mozart.  
 Weber, Op. 3. Sonatina.  
 Birkedal-Barfod, Valse (for left hand alone).  
 Mozart, Sonata in C-major, II. movement.  
 Schytte, Op. 95 Nos. 5, 9, 10. Studies.  
 Raff, Study in C-major.  
 Gellinek, Rondo in F-major.  
 Lack, Op. 172 Nos. 2, 4. Studies.  
 Bach, Magdalena-Album.  
 Mozart, Sonata in C-major, I. movement.  
 Bach, 12 small Preludes.  
 Lack, Op. 75 Nos. 2, 3, 5, 6, 7, 9, 10. Studies.  
 Haydn, Sonata in E-minor, III. movement.  
 Schmitt, Op. 3 Nos. 5, 12, 15, 23. Studies.  
 Hummel, Perpetuum mobile (for left hand alone).  
 —, Song (for left hand alone).  
 Mozart, Rondo in D-major.  
 Scarlatti-Tausig, Pastorale.  
 Mac Dowell, Impromptu.  
 Mozart. Sonata in A-minor, I. part.  
 Hummel, Study (for left hand alone).  
 Bach, Inventions.  
 Schubert, op. 90 No. 2. Impromptu, I. part.  
 Ilynsky, Butterfly.  
 Arensky, op. 36 No. 5. Forest Brook.  
 Haessler, Toccata.  
 Clementi-Tausig, Gradus ad Parnassum Nos. 1, 2, 21.  
 Mendelssohn, Song without Words. No. 34.  
 Wiehmayer, Universal Studies Nos. 4, 5, 7, 8.  
 Bach, Preludes and Fugues.  
 Arensky, op. 36 No. 13. Study in F $\sharp$ -major.  
 Moszkowsky, op. 72 No. 5, 6. Studies.  
 —, op. 36 No. 4. In Autumn.  
 Arensky, op. 46 No. 1. At the Spring.  
 Schumann-Tausig, Contrebandier.  
 Rachmaninoff, op. 11. Barcarolle.  
 Weber, op. 24. Perpetuum mobile.

Tschaikowsky, *Perpetuum mobile* by Weber (for the left hand alone).

Chopin, op. 25 No. 2. Study.

Sapelnikoff, op. 3. Dance of the Elves. Study.

(Double Notes).

Czerny, op. 261 No. 15, 23. Studies.

Czerny-Germer, Part. II, Nos. 15, 26. Studies.

Cramer, Studies, Nos. 26, 28, 33, 34, 46, 47, 48.

Schytte, op. 75, part VIII, Nos. 1, 2. Studies.

Czerny, op. 740 Nos. 34, 39. Studies.

Kleinmichel, Study alla Toccata.

Moscheles, op. 70 No. 13. Study.

Pachulsky, op. 7 No. 1. Evening Harmony.

Chopin, op. 37 No. 2. Nocturne. I. part.

Czerny, op. 92. Toccata.

Arensky, op. 74 No. 12. Study.

Pachulsky, Etude dédiée à Strobl (E<sub>7</sub>-major).

Wiehmayer, Universal Studies No. 11.

Rosenthal, Study on Chopin, op. 64 No. 1. Waltz.

Rachmaninoff, op. 23 No. 9. Prelude.

Chopin, op. 25 No. 6. Study.

2. For Staccato Playing (Finger Staccato).

Schumann, op. 68 No. 8. Wild Horseman.

Reinhold, op. 58 No. 4. Playing at Soldiers.

Schytte, op. 95 Nos. 1, 3. Studies.

Glière, op. 34 No. 6. The little Bells.

Jadassohn, Scherzo in C-major.

Schmitt, op. 3 No. 22. Study.

Schumann, op. 118b No. 4. Children's Party.

Mendelssohn, Song without Words No. 32.

Liszt-Wrede, Staccato Study.

Beethoven, op. 31 No. 3. Sonata. II. movement.

Mendelssohn, op. 16 No. 2. Capriccio.

Chopin, op. posth. Study in D<sub>7</sub>-major.

## 3. For Repeated Notes.

- Schytte, op. 108 Nos. 10, 11. Studies.  
 Czerny-Germer, part I, No. 34. Study.  
 —, op. 636 No. 9. Study.  
 —, op. 849 Nos. 12, 26. Studies.  
 Schmitt, op. 3 Nos. 9, 10. Studies.  
 Czerny, op. 299 No. 22. Study.  
 Cramer, Studies Nos. 12, 45, 52.  
 Czerny, op. 740 No. 35. Study.  
 Clementi-Tausig, Gradus ad Parnassum, No. 14.

**The Hand Stroke.** To learn the hand stroke it is advisable above all to perform the C-major scale in double thirds, sixths, and octaves with the same fingers, namely, for thirds with the 1st and 3rd, the 2nd and 4th, the 3rd and 5th; but for sixths and octaves employ the 1st and 5th fingers. To prevent superfluous movements of the hand, the distance between the playing fingers should be kept constant; the idle fingers may be held close together.

## Model Exercises:

Count: "One (= lower the hand), two (= raise the hand)"; M.M. ♩ = 60.

20.

Count: 1 2 etc. etc. etc.



Following the same system the C-major scale should be played with one finger only; for this it will be advisable, in order to prevent superfluous finger movements, to hold the 2nd, 3rd, 4th, and 5th fingers with the thumb, and the thumb with the side of the 2nd finger.



Following this method all the scales may be played either in single or in double notes; it is advisable to protrude the active fingers slightly, in order to prevent the other fingers from interfering with the keys.

#### Further Exercises:

Lütschg, *The Technique of Piano Playing*, parts I and II.  
Pfeiffer, *Virtuoso-Studies* Nos. 34, 35, 69b, 69d, and others.

Kullak, op. 48. *School of Octave Playing*, part I.

#### Studies and Recitations for the Hand Stroke.

##### 1. For Staccato Playing of Double Notes.

Schytte, op. 160 No. 5. Study.

—, op. 108 No. 20. Study.

Schmitt, op. 3 No. 1. Study.

Tschaikowsky, op. 39 No. 3. *Le petit Cavalier*.

Maikapar, op. 14. 12 Preludes.

Spindler, op. 221 No. 2. Study.

Schmitt, op. 3 No. 19. Study.

Schytte, op. 75, part VI, Nos. 2, 3. Studies.  
 Pacher, Op. 11. 6 Octave Studies.  
 Löw, op. 271 Nos. 1—6. Octave Studies.  
 Kobyljansky, 6 Octave Studies.  
 Kullak, op. 48 No. 5. School of Octave Playing.  
 Moszkowsky, op. 72 No. 4. Study.  
 Maikapar, op. 13. Two Octave Intermezzos.  
 Leschetitzky, Octave Intermezzo.  
 Moszkowsky, op. 72 No. 9. Octave Study.  
 Weber, op. 12. Momento capriccioso.  
 Moszkowsky, op. 36 No. 6. Etincelles.  
 Goedicke, op. 22. 4 Octave Studies.  
 Wiehmayer, Universal Studies, No. 12.  
 Pachulsky, Octave Study in G $\sharp$ -major.  
 Liszt, VI. Hungarian Rhapsody. Final part.  
 Rubinstein, op. 23 No. 2. Study.

2. To replace the finger staccato.

(See studies and recitations for finger staccato)

**The Forearm and Upper-Arm Strokes.** To develop the forearm and upper-arm strokes the same exercises taken up in the same order as stated for the hand stroke, may be chosen; the difference between the two strokes consists only in the height to which the arms are raised.

### **Studies and Recitations for the Forearm and Upper-Arm Strokes.**

1. In raising and lowering the arms to the keyboard, i. e. in pauses and transfers.

Schytte, op. 160 Nos. 15, 16. Studies.  
 Schumann, op. 68. No. 4. Study.  
 Glière, op. 43 No. 1. Prelude.  
 — , op. 31 No. 8. Study.  
 Schmitt, op. 3 No. 26. Study.  
 Bach, Ph. Em., Solfeggio.  
 Maikapar, op. 8 No. 18. The Nymph.

Schytte, op. 75, part IV, Nos. 2, 3, 5, 6. Studies.  
 Cramer, Studies Nos. 17, 42, 43.  
 Puchalsky, op. 5 No. 5. Study.  
 Arensky, op. 42 No. 3. Study.  
 Mendelssohn, Study in F-minor.  
 Czerny, op. 740 No. 6. Study.  
 Arensky, op. 74 Nos. 5, 6. Studies.  
 Mendelssohn, op. 35 No. 1. Prelude.  
 Godard, Etude de concert, G-major.  
 — , op. 107 En Songe (In a Dream). Study.  
 Puchalsky, op. 11. The Whirlwind. I. part.  
 Mendelssohn, op. 43. Serenade and Allegro giojoso.  
 II. movement.

2. To replace the hand stroke.  
 (See studies and recitations for the hand stroke.)

### 3. For Portamento.

Reinecke, op. 170. From "Arabian Nights".  
 Schumann, op. 68. Poor Child.  
 Czerny, op. 335 No. 2. Study.  
 Beethoven, op. 13. Sonata. II. movement (bars 17—20;  
 48—50; 66—70 etc.).  
 Chopin, op. 9 No. 2. Nocturne (bars 8, 10, 12, 16,  
 17 etc.).  
 — , op. 27 No. 2. Nocturne (bars 8, 15, 17, 25, etc.).  
 — , op. 10 No. 9. Study.

### 4. For Martellato.

Czerny, op. 261 No. 91. Study.  
 Czerny-Germer, Study No. 19.  
 Mendelssohn, Variations sérieuses Nos. 5, 12, and Final.  
 Schytte, op. 75, part IV, No. 4. Study.  
 Löw, op. 281 No. 8. Study.  
 Czerny, op. 740 No. 38. Study.  
 Kullak, op. 48 No. 6. Study.



Saint-Saëns, op. 52 No. 3. Study.

Arensky, op. 74 No. 3. Study.

Rachmaninoff, op. 3. Prelude (Presto in intermediate part).

Liszt, II. Hungarian Rhapsody (Prestissimo).

— , Campanella (trill with both hands).

### **III. MEANS OF STRENGTHENING THE FINGER STROKE, OF INCREASING ENDURANCE OF THE FINGERS, OF DEVELOPING VELOCITY, OF EQUALIZING THE TONE, AND OF THE ACQUISITION OF THE MAXIMUM LEGATO**

1. Weighted Playing. 2. Rolling Action.

3. The Combined Arm-Swing.

We have seen before that in isolated finger technique the fingers, by the aid of their extensor and flexor muscles, are capable of exercising a very limited force; they tire rapidly, especially if they are raised excessively high, and a uniform tone production cannot be achieved; the sounds are invariably more or less staccato. All these faults are characteristic of the methods of instruction developing an isolated finger technique. Modern piano pedagogy demands only a minimum exertion of force to be expected from the fingers, and in order to achieve this a number of means have been devised by the aid of which the aforementioned drawbacks of the pure finger technique are completely eliminated. These means are the following:

1. Weighted Playing; 2. Rolling Action, and 3. The Combined Arm-Swing. We will now consider them in detail.

#### **1. Weighted Playing.**

By the term "playing assisted by the weight of the arm", or more simply, "weighted playing", we denote such

playing in which the action of the finger stroke is enhanced by adding the weight of the remaining parts of the arm, which are kept in a passive state. The concept of weighted playing comprises two fundamental elements, namely, the stroke of the finger, and the weight of the arm. The finger stroke cannot be entirely eliminated even in weighted playing, since it is the nature of the piano to be a percussion instrument operated by means of strokes. On the other hand, the addition of a part of the remaining weight of the arm to the finger stroke is achieved by lessening the activity of the upper-arm and shoulder muscles to such an extent that the entire mass of the arm is centred in the finger tips about to strike the keys.

Weighted playing enables the pianist to attain perfect legato playing. A good legato requires perfect binding of the successive tones. In the pure finger playing this binding has to be achieved by the action of the fingers alone, which involves vast labour with a very little result. Whereas in weighted playing there is no necessity to let the fingers perform the binding of the successive tones; the weight of the arm prevents the fingers from leaving the keys, and thus the tones are produced in a legato manner without any difficulty.

The isolated finger technique also leads to ununiform performance, inasmuch as each finger is endowed only with its own physical strength, and this strength varies amongst the different fingers. In weighted playing, on the other hand, the tones are reproduced with equal strength by virtue of the fact that the weight of the arm remains constant.

Isolated finger playing can also produce only a very small tone strength, owing to the weakness of the finger extensors and flexors. In weighted playing the source of strength does not lie in the finger muscles, but in the weight of the arm added to the finger stroke, which is so great that its maximum weight is only rarely employed in piano playing.

Finally, the fingers tire exceedingly quickly in isolated finger playing, for the simple reason that the strength of the fingers is very limited. In weighted playing the fingers do not tire so quickly, because the real source of strength is not

the activity of the fingers, but the passive weight of the arm; the fingers only perform a very small part of the work, inasmuch as they represent in a certain sense the points of support in transferring the centre of gravity of the weight of the arm from one key to another.

It follows from this that the weighted playing has an immense significance in piano playing; it is employed in one of the most important modes of striking, namely, in legato playing, making the strength of the tones uniform for all the fingers, increasing the tone volume, and finally improving the endurance of the fingers.

Up to the present we have always mentioned the entire weight of the arm, as being the maximum weight to be borne by the fingers. There is of course a large range of unlimited variability of weight below this maximum weight, extending to a minimum at which the keys are barely depressed; the minimum weight depends on the sensitiveness of the instrument used. It is of course beyond the scope of our capacity to discuss the infinite series of weights from the maximum to the minimum; we restrict ourselves to a distinction of four chief weights, namely: the total weight of the arm from the shoulder down ("the weight of the upper arm"); the weight of the arm from the elbow downwards ("the weight of the forearm"); "the weight of the hand", from the wrist downwards; and "the weight of the fingers" alone. We shall discuss each of these four items, and indicate the methods by means of which the sense of weight corresponding to each may be successfully developed.

The weight of the upper arm comprises the weight of the entire arm from the shoulder downwards, provided that it is kept in a passive state. If the weight of the entire arm is placed on the fingers, they are subjected to maximum pressure, and are accordingly forced to maintain the strongest muscular tension. The weight of the mass of the entire arm, which is placed on the fingers, varies from one to two kilograms, according to the build of the arm. In order to acquire the



sense of maximum weight on the fingers, the following course may be pursued with success. Stretch the entire arm out over the surface of a table, so that only the tips of the fingers

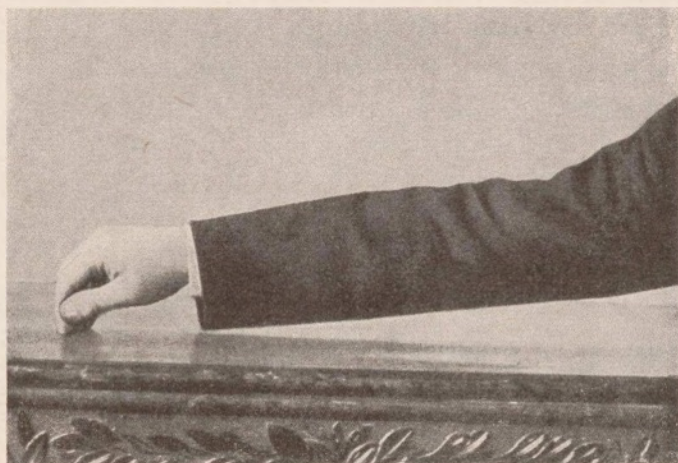


Fig. 11. The weight of the upper arm.

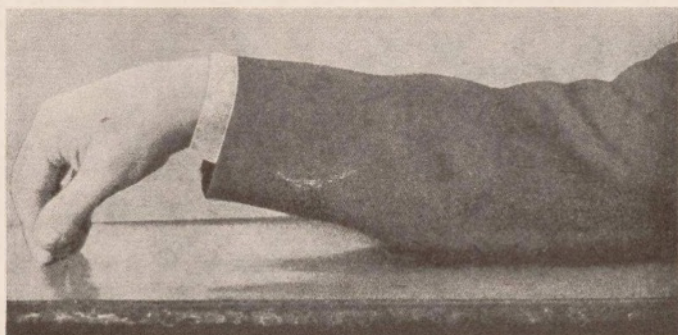


Fig. 12. The weight of the forearm.

touch the table. This is shown in figure 11. After a few seconds the entire arm will be in a passive state, and the finger tips will be forced to withstand the pressure of the maximum weight of the arm; this weight is so great that the single fingers can only with difficulty bear it.

The weight of the forearm comprises the part of the arm from the elbow downwards, provided that it is kept in a passive state. By the aid of suitable groups of muscles the weight of the upper arm can be eliminated. When subjected to the weight of the forearm only, the fingers have much less to bear than if under the pressure of the entire arm, and hence the degree of tension under which the muscles are kept, is considerably lessened.

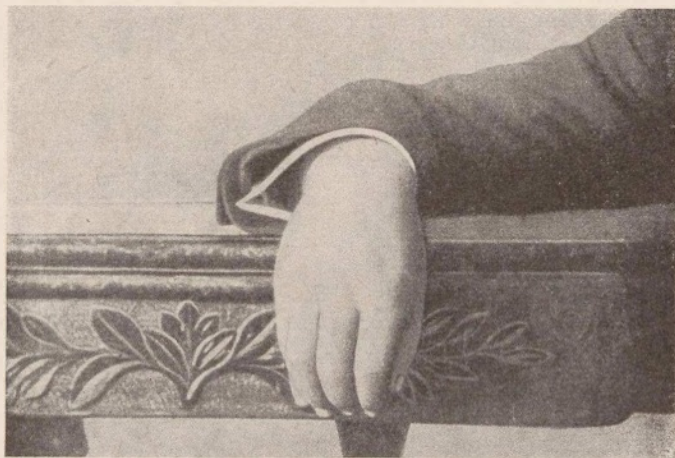


Fig. 13. The weight of the hand.

The weight of the participating mass may in this case be estimated at least from 500 to 1500 grams, according to the individual build and form of the forearm. The forearm weight is generally employed for loud (*forte*) playing. To develop the sense of weight in this case, we recommend the following procedure: lay the arm on a table so that the elbow and the finger tips touch the table surface, as shown in figure 12. After a few seconds we will recognize the pressure of the forearm on the finger tips; the weight of the upper arm is entirely eliminated by reason of the elbow touching the surface of the table.

The weight of the hand comprises the part of the arm from the wrist downwards, provided, of course, that it is

also kept in a passive state. By the aid of certain suitably chosen groups of muscles, the weights of the forearm and upper arm may be eliminated. The weight of the entire mass participating in playing with the weight of the hand can be taken to be about 250 to 500 grams. The fingers have only a small weight to bear, and hence the tension of the finger muscles is only slight. The weight of the hand is generally employed for

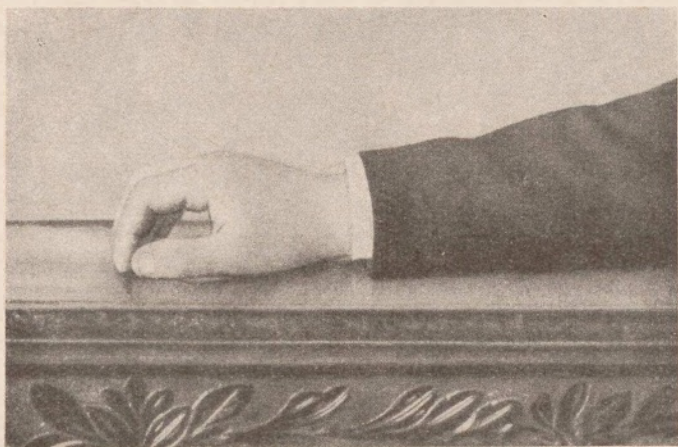


Fig. 14. The weight of the fingers.

soft (piano) playing. In order to develop the sense of weight of the hand, the following method may be taken: place the forearm on a table so that the hand extends over its edge, as shown in figure 13; then lay a book or small board underneath the finger tips, and lift the book together with the hand up to the level of the table; the result will be that the fingers feel only the weight of the hand, because the weight of the fore and upper arms remain on the table.

To determine the weight of the fingers the weights of the hand, the forearm, and the upper arm must be eliminated. The weight of the fingers is only a few grams; the tension of the fingers when subjected to their own weight only, is a minimum, because the finger tips have but a minimum weight to bear. To develop the sense of weight of the fingers,



lay the forearm on a table, pressing the wrist well down on its surface, as shown in figure 14. The fact that the wrist lies on the table proves the weight of the entire arm with the exception of the fingers to be eliminated, and hence the finger tips feel only their own weight.

For practical reasons we have distinguished only four chief types of weight. Amongst these the weight of the upper arm and that of the fingers represent the maximum and the minimum weights respectively. Owing to its excessive magnitude the weight of the upper arm is only rarely employed, and the finger weight can, in the strict sense of the word, find no application in piano playing at all, because it is so insignificant that weighted playing with the fingers is only possible if at least a fraction of the weight of the remaining part of the arm is added to them. The finger weight alone is not sufficient to produce what we call weighted playing; we are here actually concerned with isolated finger technique only. Nevertheless the extreme development of the sense of weight will be found useful, though for this purpose it is not necessary to resort to practising on a piano, as the exercises on the table, as indicated, are fully sufficient. In this way we gradually become familiar with varying weights on the tips of the fingers, and we will be conversant with the limits between which these variations take place. The other types of weights, i. e. the weights of the forearm and of the hand, are frequently applied in piano playing: the former is usually employed for loud and the latter for soft playing.

By means of a set of scales the magnitude of the weights which we employ for the various styles of performance, can be easily determined. It is advisable to use for this purpose a spring balance, equipped with a flat dish, i. e. a so-called automatic balance. In case the passive state is interrupted, or, in other words, if the muscles are active in the slightest degree, the index of the scales will be seen to deflect quickly; if, on the other hand, the sense of passivity is sufficiently developed, the balance can be held practically motionless.

In conjunction with the description of the style of performance which we have here denoted by weighted playing, a few

words may be added about the slur, which is placed over the notes for the legato movements. The slur causes innumerable misunderstandings in practice, because it is rarely correctly placed. It must be mentioned that the slur as such has a twofold significance, namely a theoretical and a technical one.

In the former case the slur indicates not only the legato playing, but also the groups of notes which are to represent a certain characteristic rhythmic figure (motive), from which the given phrase is developed, or, in some instances even entire phrases and periods; in such cases there is no indication as to where to lift the hand off the keyboard. So, e. g. in Chopin's op. 64 No. 2, Waltz.



indicate the proper moment at which the hands should be raised from the keys. Recently attempts have been made at placing the slur over the notes only in a technical sense. It is up to the teacher to correct all the slurs found in the musical sheets of the students. In all such cases the teacher should restrict himself to applying the slur only for technical purposes.

## 2. Rolling Action.

By "rolling action" we denote rotations of the arm around its axis. Anatomically speaking, rolling motions can be performed exclusively in the elbow and shoulder joints. The rolling action of the upper arm rarely occurs in piano playing, whereas that of the forearm is very frequently employed. If, therefore, we speak of rolling action in the following, we mean rolling action of the forearm.

Forearm rolling can be performed towards both sides. The rolling towards the outside, i. e. away from the body, is called *supination*, the rolling towards the inside, i. e. towards the body, is called *pronation* (see figs. 15 & 16).

Rolling action is frequently employed in everyday life, as for example, in turning a key.

Forearm rolling has the remarkable property of increasing the strength of the stroke and the velocity, as well as producing uniformised tones.

For anatomical reasons the forearm is particularly adapted for performing these rolling motions; a very slight expenditure of muscular energy is required to turn the comparatively large mass of the arm from the elbow to the finger tips. During the play the fingers continue to carry out their limited functions of striking the keys with their peculiar small strength; the forearm, however, is added to the finger stroke by rotation around its axis, so that the force of the tone is produced not only by means of the fingers alone, but by means of the forearm which, in a manner of speaking, plays the role of a flywheel. At the same time the rotation of the forearm



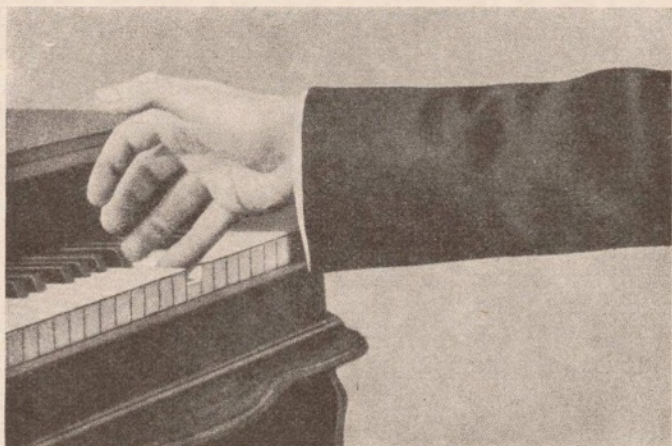


Fig. 15. Supination.

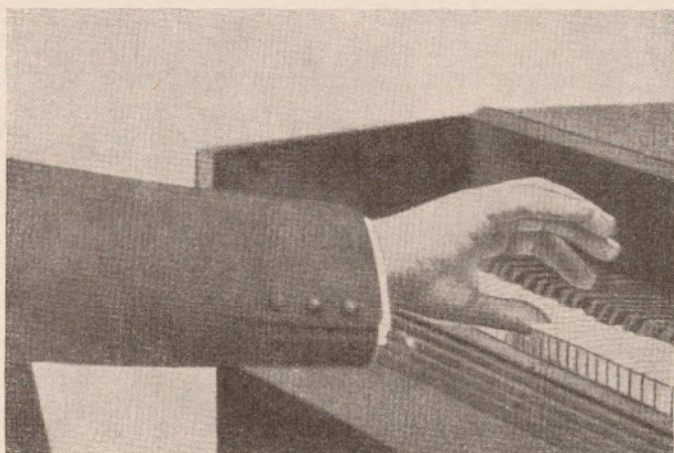


Fig. 16. Pronation.

implies a certain activity of the large upper-arm and shoulder muscles, so that considerable power is developed, and the fingers do not tire so easily.

The rolling action of the forearm also enhances velocity, as we mentioned above. This becomes manifest from the following considerations: if the different lengths of the separate

fingers are observed, the bent fingers during the rolling action form in a certain sense the spokes of a rolling wheel, the axis of which is formed by the length of the arm from the elbow to the finger tips. The rotation of the wheel in the one or the other direction materially fosters the rapid passing of the fingers over the keys, from the first to the fifth in supination, and conversely, from the fifth to the first in pronation. When rotating the forearm it is not necessary to stretch and bend each finger separately and successively as in isolated finger playing, which consumes so much time; the rolling action of the forearm performs in a single rotation a quick passage of the five tones upwards or downwards on the keyboard. Nearly no movement of the fingers takes place during this action. If, e. g. the fingers are stretched out and bent in succession to produce five tones from the first to the fifth, and vice versa from the fifth to the first, ten movements must be performed, which is a much larger number of movements than in the rolling motion of the forearm, which produces five tones with one movement. A test also shows that the rolling actions are more rapid than any others; each one of the five fingers is capable of carrying out five to eight strokes per second; in rolling action, however, the number of strokes performed in a second is nine to twelve. It follows from this how important the rolling actions are for developing velocity.

By means of rolling action, finally, uniform playing is developed, with respect to tone sonorousness. We pointed out above (page 50) that each separate finger is endowed only with its own definite strength. Hence in pure finger technique the strength of the tones produced will vary considerably; in rolling action, however, the tones are not produced by the fingers alone, but by the aid of rotation of the forearm, which movement is added to that of the fingers. Hence the strength of the tones produced when employing rotation of the forearm will be absolutely uniform, independently of the strength of each of the fingers.

The application of forearm rolling in piano playing is very wide; we employ it in playing figurative arpeggios and

chords of all sorts, tremolos, trills, in transferring the arms from one part of the keyboard to another (see part II, chapter IV, 2), and in passing the thumb under the other fingers (see part II, chapter IV, 1). The purest form of forearm rolling is performed in playing tremolos and figurative arpeggios.

Upper-arm rolling is rarely resorted to, as, in rolling the entire arm, the elbow joint must be straightened out, and such positions only occur when the hands are at the utmost extremities of the keyboard, and when transferring the arms over large distances.

### Model Exercises.

Count: „One (= pronation), two (= supination)”;  
M. M. ♩ = 60.

24. 1 5 1 5

Count: 1 2 1 2

25. 1 5 1 5

26. 1 5 4 5 3 5 2 5 1 5 1 5 1 5



5 1 2 1 3 1 4 1 5 1 5 1 5 1

etc.

4 5 3 5 2 5 1 5 1 5 1 5

27. 1 3 2 5 1 4 2 5 1 4 2 5 1

etc.

5 2 4 1 5 2 3 1 5

5 2 3 1 5 2 4 1 5 2 4 1 5

etc.

4 2 5 1 3 2 5 1 4 2 5 1

28. 1 2 3 5 1 2 4 5 1 2 4 5 1

etc.

5 4 2 1 5 3 2 1 5

5 3 2 1 5 4 2 1 5 4 2 1 5

etc.

1 2 4 5 1 2 3 5 2 4 5 1

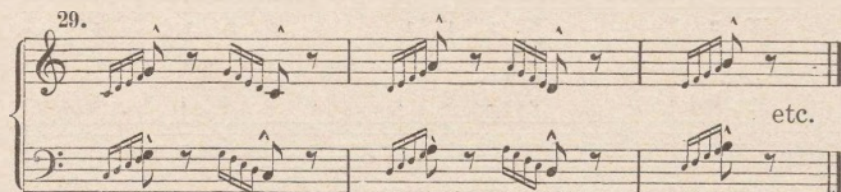
In the same manner various figurative arpeggios should be played in all rhythms and directions, as well as all the major and minor triads, diminished and dominant sevenths and their inversions. Furthermore, the following exercises may be recommended:

Hanon, *The Piano Virtuoso*, Nos. 31, 49, 60.

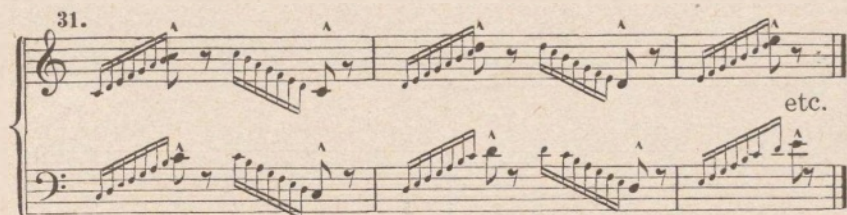
Nikolaiewsky, *Complete Manual for the Study of Scales and Arpeggios*.

Tausig, *Daily Studies*, part I, chapter III; part II, chapter III.

Model Exercises for developing velocity.



When the student has made himself familiar with the movement of passing the thumb under, exercises similar to the following models should be practised:







Studies and Recitations for practising the rolling action.

Schytte, op. 108, No. 15. Study.

Czerny, op. 261 No. 33. Study.

Gurlitt, op. 140 No. 5. The Murmuring Brook.

Schumann, op. 118 No. 6. Lullaby.

Glière, op. 34 No. 19. Serenade.

Reinhold, op. 58 No. 2. Silhouette.

Burgmüller, op. 109 No. 5 & 11. Studies.

Spindler, op. 221 No. 1. Study.

Puchalsky, op. 5 No. 3 & 8. Studies.

Schmitt, op. 3 No. 21 & 30. Studies.

Grieg, op. 62 No. 4. Little Brook.

Mendelssohn, Song without Words No. 30.

Cramer, Studies Nos. 2, 6, 19, 20, 37, 57.

Czerny, op. 299 No. 20. Study.

Schytte, op. 75, part IX No. 3. Study.

Leschetitzky, op. 31 No. 3. Papillon (The Butterfly).

Czerny, op. 740 Nos. 4, 14, 27, 28, 50. Studies.

Clementi-Tausig, Gradus ad Parnassum. Nos. 3, 18, 24, 28.

Arensky, op. 74 Nos. 4, 8, 9, 10. Studies.

Schumann, op. 23 No. 4. Nachtstück (Nocturne).

—, op. 82. The Prophet Bird.

Henselt, op. 2 No. 3. Exauce mes vœux (Harken to my Longing).

Beethoven, op. 26. Sonata. IV. movement.

Wiehmayr, Universal Studies Nos. 6, 6a, 10.

Moszkowsky, op. 72 No. 7. Study.

Moscheles, op. 70 No. 2. Study.

Moszkowsky, op. 72 No. 3. Study.



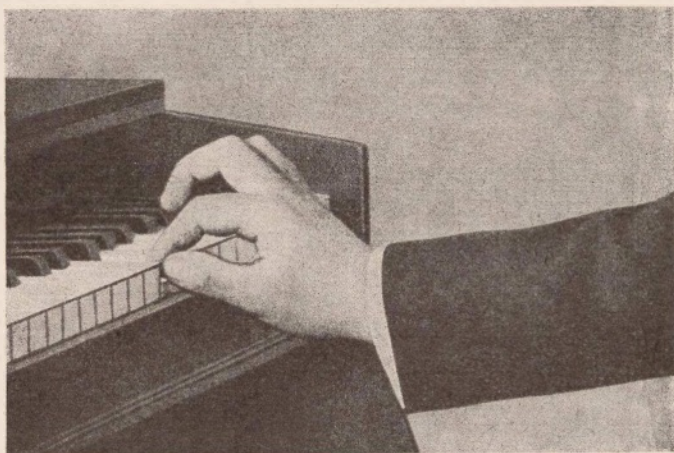


Fig. 17. Position immediately prior to performing the combined arm-swing.

Chopin, op. 28 No. 8. Prelude.

Rachmaninoff, op. 23 No. 8. Prelude.

Chopin, op. 10 Nos. 1, 5, 9, 11. Studies.

—, op. 25 Nos. 11, 12, 13. Studies.

### 3. The Combined Arm-Swing.

By the expression "combined arm-swing" we mean a certain movement of the entire arm from the shoulder downwards, in which all the parts of the arm are added to the finger stroke with participation of the extensor and flexor muscles. The fingers have no independent function in such movements, being regarded as the continuation of the entire arm. The movement is performed as follows: Before lowering the finger, let down the wrist; at the same time as the finger strikes the key, raise the wrist slightly, thus placing the entire mass of the arm upon the key struck by the finger. Generally speaking, the appearance of the arm in performing the combined arm-swing is given by figures 17 & 18.

When the finger is raised, the wrist is at the same time lowered, and conversely, when the finger is lowered again, the wrist must be raised.

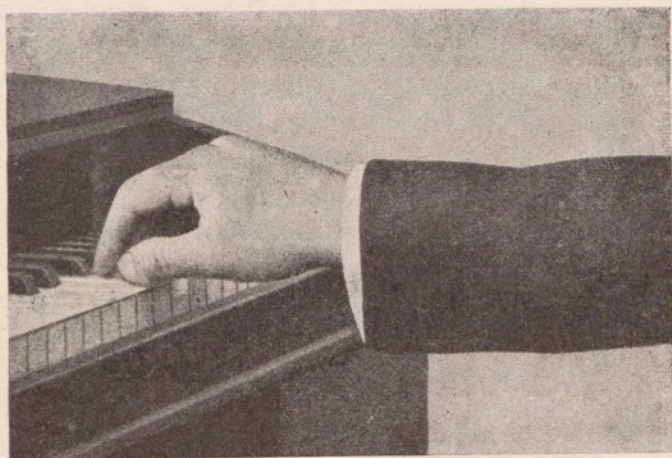


Fig. 18. Position immediately after the combined arm-swing.

The combined arm-swing enables the player to produce very loud tones on the piano, because the tone production is not only caused by the stroke of the finger, but by the mass of the entire arm, which is added to the striking finger. Owing to the complicated nature of the movements, and to the participation of the entire arm, the combined arm-swing is only employed in the performance of very slow playing, such as slow melodies requiring a powerful execution, and stressing of certain notes in *appoggiaturas*, turns, etc., in which the fundamental note must be accentuated.

#### Model Exercises.

Count: "One (= raise wrist while lowering finger), two (= lower wrist while raising finger)"; M. M. ♩ = 60.

33.

Count: 1 2    1 2





Schmitt, op. 3. No. 14. Study.  
Liszt, Dance of the Gnomes (I. part).

#### IV. MOTION OF THE ARM ON THE PIANO

The motion of the entire arm on the piano is performed in a twofold manner, according to whether the fingers are left on the keyboard, or removed from the keys. In the former case the arm moves with participation of the fingers. Of course all the five fingers participate in the motion of the arm according to their adductive and abductive movements. The passing-under of the thumb is of especial significance and rather difficult, and we shall therefore discuss this item in detail afterwards. In the second case the arm moves without participation of the fingers by transferring it from one part of the keyboard to another.

##### 1. Motion of the Arm on the Piano with Participation of the Fingers.

Passing the Thumb under the Fingers, and  
Passing the Fingers over the Thumb.

The passing-under of the thumb and the passing of the fingers over the thumb are two movements which are distinguished for the following reasons: When the thumb is passed under the fingers, it is moved underneath the palm, a movement which is not entirely natural because the natural destination of the thumb is to occupy a position opposite the other fingers, in order to assist them in grasping objects. When the fingers are passed over the thumb, the latter must perform a motion from under the palm into its normal position. Hence the passing-under of the thumb is considerably more difficult than the passing of the fingers over the thumb. It is, therefore, necessary to achieve some dexterity in performing this movement, by practising certain kinds of exercises designed to train the thumb to bend inwards, underneath the palm to a certain distance without producing excessive tension.

The movements of the hand which accompany the

movement of passing the thumb under or of passing the fingers over are: the turning of the hand inwards (a d d u c t i o n), and the turning of the hand outwards (a b d u c t i o n), respectively, and the rolling action of the forearm (see figs. 19 & 20). These movements facilitate and simplify the passing-under of the thumb to a considerable degree. In general students perform them when passing the fingers over the thumb, while



Fig. 19. Turning the hand inwards (adduction).

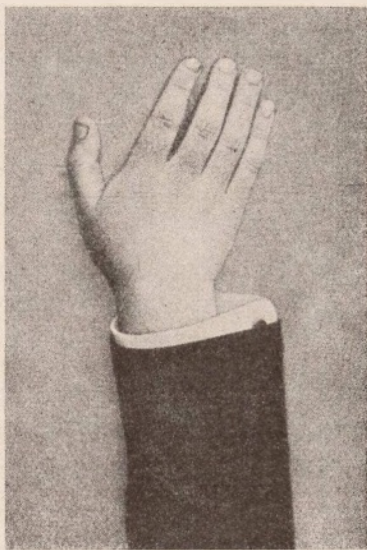


Fig. 20. Turning the hand outwards (abduction).

they omit them when passing the thumb under the fingers, which is the source of many difficulties in performing the passing-under movement of the thumb adequately.

The significance of the inward turning motion of the hand in the movement of the passing-under of the thumb is the following: without turning the hand inwards, the motion of the thumb will not exceed more than a second on the keyboard, which is known to be insufficient in playing arpeggios and scales; the result is that the thumb tends to glide off the keys, making the performance jerky (see fig. 21).



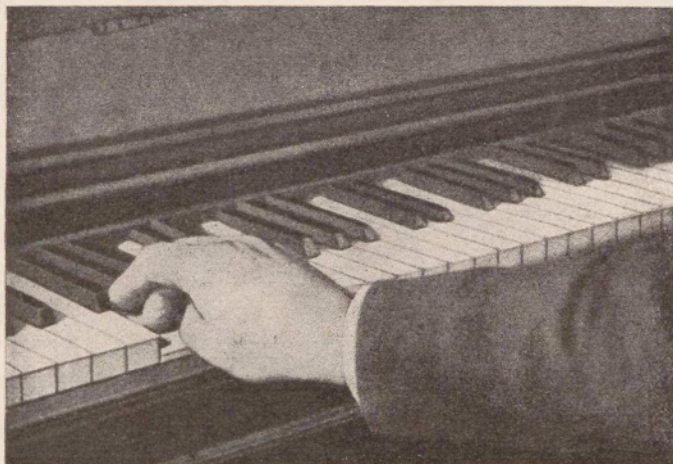


Fig. 21. Passing the thumb under the fingers without turning the hand.



Fig. 22. Passing the thumb under the fingers while turning the hand inwards.

If, however, the hand is turned inwards while passing the thumb under the fingers, the motion of the thumb can be increased considerably without causing thereby any exertion



whatsoever, the distance thus achieved being a fourth, or even more. This distance is entirely sufficient for scales and arpeggios (see fig. 22). For this reason some pedagogues such as D e p p e and C a l a n d recommend keeping the hand slightly turned inwards (adduced) throughout the performance.

The rolling action of the forearm also enhances and eases the motion of the mass of the arm: in pronation the fifth finger and its neighbours are transferred, in supination, on the contrary, — the thumb and its neighbours; so that, in passing the fingers over the thumb it will be found to be advisable to perform a pronation, while in passing the thumb under the fingers, a supination materially facilitates the execution.

The movements which we have considered so far, namely, turning the hand inwards and outwards respectively, or adducing and abducting the hand, and the rolling action of the forearm, facilitate only the passing of the thumb under the fingers and the passing of the fingers over the thumb, but not the motion of the mass of the entire arm from one part of the keyboard to another. This latter movement is performed by means of the upper-arm and shoulder muscles, which direct the arm in either direction without necessitating all sorts of superfluous and injurious movements of the arm, such as awkward and angular movements of the elbows.

All the movements considered in the foregoing, commencing with the thumb, and ending with the movements of the shoulder, must be performed uniformly, gradually, and not abruptly; the movements should be performed gradually during the space of time between two passing-under movements of the thumb, as the thumb will otherwise be too late and the abrupt movements of the elbow will cause the performance to appear interrupted and broken.

Generally speaking, the impression received should be that of a quite and uniform motion of the entire arm from the shoulder to the finger tips.

The importance of proper passing-under of the thumb or passing of the fingers over the thumb lies in the rapid and

uniform motion of the entire arm without lifting the fingers from the keyboard. The passing-under of the thumb and passing of the fingers over the thumb is invariably employed in playing scales, arpeggios, or similar passages.

### Model Exercises:

Count: 1—2—3—4; M. M. ♩ = 60.

35.

The musical score for Model Exercise 35 consists of three systems, each with a treble and bass staff. The exercises are in C major, 4/4 time, and consist of 16 measures each, divided into two 8-measure phrases. Fingerings are indicated by numbers 1-5 above or below notes.

**System 1:**

- Treble Staff:**
  - Measures 1-4: 1 5 1 5, 1 4 1 4, 1 3 1 3, 1 2 1 2
  - Measures 5-8: 5 1 5 1, 4 1 4 1, 3 1 3 1, 2 1 2 1
- Bass Staff:**
  - Measures 1-4: 1 2 1 2, 1 3 1 3, 1 4 1 4, 1 5 1 5
  - Measures 5-8: 2 1 2 1, 3 1 3 1, 4 1 4 1, 5 1 5 1

**System 2:**

- Treble Staff:**
  - Measures 1-4: 1 5 1 5, 1 4 1 4, 1 3 1 3, 1 2 1 2
  - Measures 5-8: 5 1 5 1, 4 1 4 1, 3 1 3 1, 2 1 2 1
- Bass Staff:**
  - Measures 1-4: 1 2 1 2, 1 3 1 3, 1 4 1 4, 1 5 1 5
  - Measures 5-8: 2 1 2 1, 3 1 3 1, 4 1 4 1, 5 1 5 1

**System 3:**

- Treble Staff:**
  - Measures 1-4: 1 5 1 5, 1 4 1 4, 1 3 1 3, 1 2 1 2
  - Measures 5-8: 5 1 5 1, 4 1 4 1, 3 1 3 1, 2 1 2 1
- Bass Staff:**
  - Measures 1-4: 1 2 1 2, 1 3 1 3, 1 4 1 4, 1 5 1 5
  - Measures 5-8: 2 1 2 1, 3 1 3 1, 4 1 4 1, 5 1 5 1



Practise the scales and arpeggios with all inversions and in all possible manners.

#### Further Exercises:

Hanon, *The Piano Virtuoso* (Nos. 32—36).

Pabst, *Scales and Arpeggios* (I. & II. parts).

Nikolaiewsky, *Complete Manual for the Study of Scales and Arpeggios*. (I. & II. parts).

Hanon-Goldenweiser, *32 Exercises with passing-under of the thumb*.

*Studies and Recitations for passing-under of the thumb and passing-over of the fingers.*

Lack, op. 75 No. 4. Study.

Sinding, op. 33. Serenade.

Schmitt, op. 3 No. 17. Study.

Czerny, op. 849 No. 15. Study.

Duvernoy, *Deuxième Etude*.

Spindler, op. 221 No. 4. Arpeggios.

Puchalsky, op. 5 Nos. 1, 4, 9, 10. Studies.

Schytte, op. 75, part VII, Nos. 2, 4. Studies.

Mendelssohn, *Prelude in E-minor* (opus number not given).

Jadassohn, op. 15 No. 3. Impromptu.

Czerny, op. 740 Nos. 2, 21, 31, 46. Studies.

Klauwell, *Melody* (for the left hand alone).

Chopin, op. 28 No. 23. Prelude.

Mendelssohn, op. 104 No. 1. Study.

Wiehmayer, *Universal Studies* Nos. 3, 9.

—, *Special Studies* No. 3.



Leschetitzky, op. 40 No. 1. Study.  
 Chopin, op. 28 No. 3. Prelude.  
 Moszkowsky, op. 24. No. 1. Study.  
 Chopin, op. 10 Nos. 8, 12. Studies.

## 2. Motion of the Arm on the Piano without Participation of the Fingers.

### Transferring of the Arm.

The term "transfer motion" in piano playing denotes a movement of the arm in performing which the mass of the arm is moved on the keyboard over large distances along a bow-shaped curve. The transfer motion must always be carried out along a bow-shaped curve, but not along a broken line, for, according to the principles of mechanics, it is only under these conditions that the movement is not interrupted, and the strength of the stroke is preserved. We must note that in piano playing all the movements are carried out along bow-shaped curves the form of which depends upon the location of the keys, in consequence of the fact that all the movements of the arm take place around fixed fulcra, namely the shoulder, elbow, wrist, and finger joints.

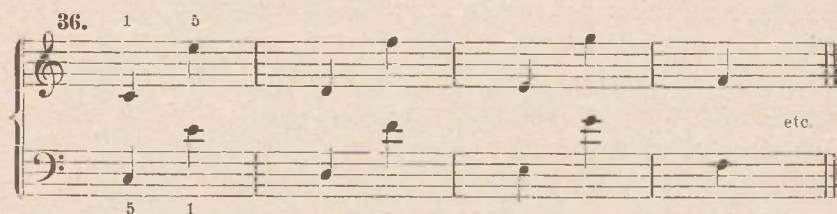
The transfer motion of the arm over long distances is only possible by movements in the elbow and shoulder joints. This transfer motion is greatly fostered by the rolling action, which, again, is possible only in the elbow and the shoulder joints. Accordingly, two kinds of transfer motions of the arm are distinguished: that executed by the aid of movements of the forearm, and that executed by the aid of movements of the upper arm. The first transfers the part of the arm from the elbow downwards, the second the entire arm from the shoulder downwards.

The significance of the transfer motion of the arm lies in its rapid and reliable transferring of the mass of the arm over considerable distances, without reducing the energy of the stroke. The transfer motion must be resorted to in all cases where the span of the fingers is insufficient to enable

them to reach the keys to be struck, thus forcing the player to remove the fingers from the keyboard. Forearm transfer motions are particularly frequently employed for transferring the arm over smaller distances, while the transfer motions of the upper arm are reserved for excessive distances. Transfer motions are of especially frequent occurrence in the accompaniment which is performed by the left hand, and in crossing the hands.

Model Exercises for forearm transfer motions.

Count: 1—2; M.M.  $\text{♩} = 60$ .



Model Exercises for the transfer motion of the upper arm.

Count: 1—2; M.M.  $\text{♩} = 60$ .



Studies and Recitations involving transfer motions  
of the arm.

Czerny, op. 261 Nos. 54, 55. Studies.

—, op. 849 No. 27. Study.

Mayer, *The Harp*.

Schytte, op. 75, part IV, No. 1. Study.

Czerny, op. 740 No. 18. Study.

Puchalsky, op. 5. No. 6. Study.

Chopin, Valses and Mazurkas (in the left-hand accompaniments).

Godard, Etude de concert, A-major.

Liszt, Au bord d'une source.

Chopin, op. 28 No. 19. Prelude.

Rubinstein, Study "On False Notes".

Liszt, The Campanella.

A particular case of transfer motions of the mass of the arm is concerned in the *glissando* playing, in which the side of the nail is slid over the keys. The *glissando* can be performed with various fingers; as a rule the third finger is used, in the one or the other direction. To prevent undue unevenness in the performance, it is advisable to support the sliding finger with one of the neighbouring ones. *Glissando* is also possible in double notes, namely: thirds can be carried out with the 1st and 3rd, or the 2nd and 4th fingers; sixths and octaves can be carried out but with the 1st and 5th fingers. The *glissando* is not a stroke in the true sense of the word, but a pressure, of which we shall speak later on (see part II, chapter V, 2). The *glissando* is employed only rarely, and therefore commands no special interest from a technical point of view.

#### Recitations for Glissando.

Liszt, X Hungarian Rhapsody (in single notes).

—, XV. Hungarian Rhapsody (in thirds).

—, V. Study of Paganini (in sixths).

Balakireff, Islamey (in octaves).

## V. SECONDARY FORMS OF TONE PRODUCTION

Up to the present we have discussed only the stroke as being the fundamental form of producing tones on the piano, according to the construction of the instrument. Besides this fundamental form there are several others of subsidiary value, namely: the drop of the arm, and pressure. We shall devote a brief discussion to them.



## 1. The Drop of the Arm.

By "drop of the arm" in piano playing we denote the movement of lowering the raised arm upon the keys by letting it fall by its own weight by means of a relaxation of the extensors. The definition of this movement that we have just given essentially characterizes this form of tone production. At first the activity of the shoulder and upper-arm muscles raises the entire arm, or, more accurately, it throws the entire arm upwards as shown in figure 23; after the arm has been raised the muscular tension must be suddenly relaxed to such an extent that the mass of the arm drops by its own weight, as shown in figure 24. Considered in the light of physiology the drop of the arm involves only a tension of the extensors of the upper arm and shoulder, and the drop of the arm under its own weight ensues as the result of the relaxation of this tension.

The degree of passivity of the muscular groups at the moment when the arm is dropped determines the magnitude of the weight that is dropped. Hitherto we mentioned only the falling of the maximum weight, which is equal to the weight of the entire arm; the minimum weight, on the other hand, may be reduced to the weight of the fingers alone. Between these limits an infinite succession of other degrees may be realized. For practical purposes we restrict ourselves to a distinction of four chief types of drops of the arm, which are determined essentially by the anatomical structure of the arm. We are alluding to: the drop of the upper arm, the drop of the forearm, the drop of the hand, and the drop of the fingers.

The drop of the fingers is almost useless in piano playing because the weight of the fingers without the participation of the flexors, as well as the flexibility of the fingers in their joints, are so slight that the keys can hardly be depressed by means of the weight of the fingers alone. The other types of the drop of the arm are, however, all applicable in piano playing, as by their aid we are enabled to execute the various gradations of strength: piano, forte, and fortissimo playing.

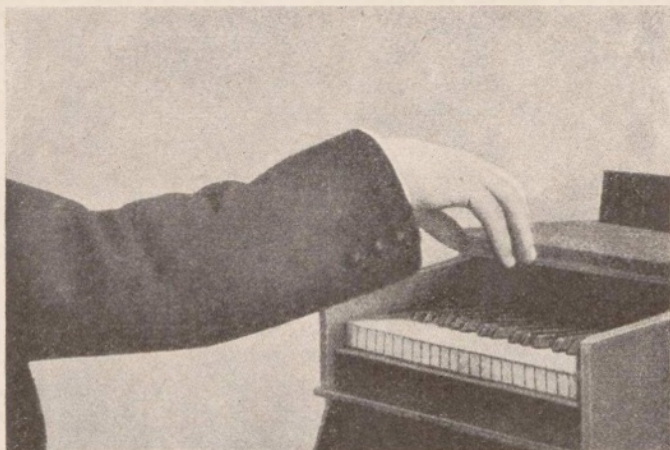


Fig. 23. Moment before dropping the arm.

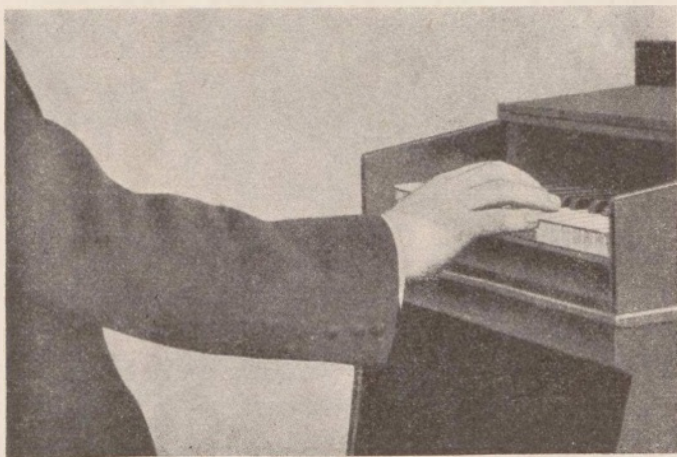


Fig. 24. Moment after dropping the arm.

The drop of the arm yields a powerful, massive tone. It is therefore applied if the tone volume is to be increased, in playing melodies as well as in accentuation of single notes, such as the mordent, which requires emphasizing the first note of the figure.

By the aid of the drop of the arm double notes may be played in a better legato manner than when performing strokes, because in the drop of the arm the weight of the arm is involved, which permits of better binding of the successive tones than if the muscles alone are employed, as is the case in executing the strokes. Moreover, the binding of double notes

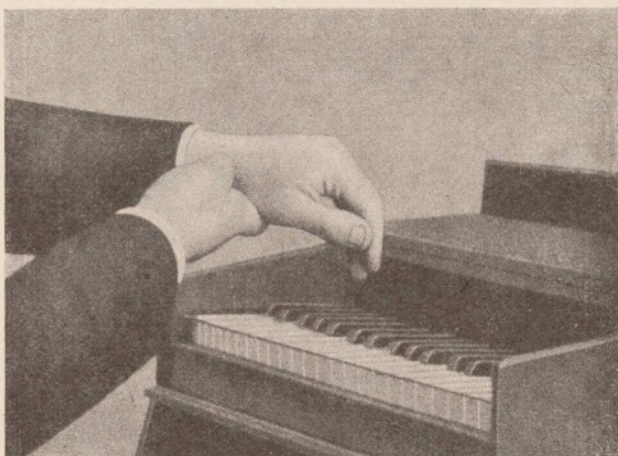


Fig. 25. Bringing the arm into a passive state.

by means of the fingers consumes a high degree of energy and causes rapid tiring of the fingers.

To develop the necessary arm-drop sensation successfully, the following method may be adopted.

The teacher grasps the student's hand as shown in figure 25, and by rocking it up and down, brings it into the passive state. Thereupon the teacher throws the arm unexpectedly upwards, so that, being left to fall by its own weight, it drops upon the keys; the result is the drop of the arm with the full weight behind it.

This method of bringing the arm into the passive state may also be recommended for producing the sensations of



weight in the arm, which are required for weighted playing (see part II, chapter III, 1); in this case the arm, after having been brought into the passive state, must not be thrown upwards, but simply lowered upon the keyboard.

For practice, the drop-method may be employed in playing the C-major scale in double thirds, sixths, and octaves with the same fingers; that is to say, the thirds with the 1st and 3rd, 2nd and 4th, 3rd and 5th fingers respectively; the sixths and octaves with the 1st and 5th fingers. To avoid superfluous movements of the hand keep the distance between the playing fingers constant, and moreover, press the idle fingers together.

### Model Exercise.

Count: "One (= dropping the arm), two (= raising the arm)"; M.M. ♩ = 60 (cf. model exercise No. 20).

38.

The musical score consists of two staves. The top staff is in treble clef and the bottom staff is in bass clef. The music is written in C major. The top staff has a key signature of one sharp (F#) and a time signature of 3/4. The bottom staff has a key signature of one sharp (F#) and a time signature of 3/4. The music is divided into three measures by double bar lines. The first measure contains two eighth notes, the second measure contains two eighth notes, and the third measure contains two eighth notes. The notes are: C4, E4, G4, B4, C5, E5, G5, B5, C6, E6, G6, B6, C7, E7, G7, B7, C8, E8, G8, B8, C9, E9, G9, B9, C10, E10, G10, B10, C11, E11, G11, B11, C12, E12, G12, B12, C13, E13, G13, B13, C14, E14, G14, B14, C15, E15, G15, B15, C16, E16, G16, B16, C17, E17, G17, B17, C18, E18, G18, B18, C19, E19, G19, B19, C20, E20, G20, B20, C21, E21, G21, B21, C22, E22, G22, B22, C23, E23, G23, B23, C24, E24, G24, B24, C25, E25, G25, B25, C26, E26, G26, B26, C27, E27, G27, B27, C28, E28, G28, B28, C29, E29, G29, B29, C30, E30, G30, B30, C31, E31, G31, B31, C32, E32, G32, B32, C33, E33, G33, B33, C34, E34, G34, B34, C35, E35, G35, B35, C36, E36, G36, B36, C37, E37, G37, B37, C38, E38, G38, B38, C39, E39, G39, B39, C40, E40, G40, B40, C41, E41, G41, B41, C42, E42, G42, B42, C43, E43, G43, B43, C44, E44, G44, B44, C45, E45, G45, B45, C46, E46, G46, B46, C47, E47, G47, B47, C48, E48, G48, B48, C49, E49, G49, B49, C50, E50, G50, B50, C51, E51, G51, B51, C52, E52, G52, B52, C53, E53, G53, B53, C54, E54, G54, B54, C55, E55, G55, B55, C56, E56, G56, B56, C57, E57, G57, B57, C58, E58, G58, B58, C59, E59, G59, B59, C60, E60, G60, B60, C61, E61, G61, B61, C62, E62, G62, B62, C63, E63, G63, B63, C64, E64, G64, B64, C65, E65, G65, B65, C66, E66, G66, B66, C67, E67, G67, B67, C68, E68, G68, B68, C69, E69, G69, B69, C70, E70, G70, B70, C71, E71, G71, B71, C72, E72, G72, B72, C73, E73, G73, B73, C74, E74, G74, B74, C75, E75, G75, B75, C76, E76, G76, B76, C77, E77, G77, B77, C78, E78, G78, B78, C79, E79, G79, B79, C80, E80, G80, B80, C81, E81, G81, B81, C82, E82, G82, B82, C83, E83, G83, B83, C84, E84, G84, B84, C85, E85, G85, B85, C86, E86, G86, B86, C87, E87, G87, B87, C88, E88, G88, B88, C89, E89, G89, B89, C90, E90, G90, B90, C91, E91, G91, B91, C92, E92, G92, B92, C93, E93, G93, B93, C94, E94, G94, B94, C95, E95, G95, B95, C96, E96, G96, B96, C97, E97, G97, B97, C98, E98, G98, B98, C99, E99, G99, B99, C100, E100, G100, B100, C101, E101, G101, B101, C102, E102, G102, B102, C103, E103, G103, B103, C104, E104, G104, B104, C105, E105, G105, B105, C106, E106, G106, B106, C107, E107, G107, B107, C108, E108, G108, B108, C109, E109, G109, B109, C110, E110, G110, B110, C111, E111, G111, B111, C112, E112, G112, B112, C113, E113, G113, B113, C114, E114, G114, B114, C115, E115, G115, B115, C116, E116, G116, B116, C117, E117, G117, B117, C118, E118, G118, B118, C119, E119, G119, B119, C120, E120, G120, B120, C121, E121, G121, B121, C122, E122, G122, B122, C123, E123, G123, B123, C124, E124, G124, B124, C125, E125, G125, B125, C126, E126, G126, B126, C127, E127, G127, B127, C128, E128, G128, B128, C129, E129, G129, B129, C130, E130, G130, B130, C131, E131, G131, B131, C132, E132, G132, B132, C133, E133, G133, B133, C134, E134, G134, B134, C135, E135, G135, B135, C136, E136, G136, B136, C137, E137, G137, B137, C138, E138, G138, B138, C139, E139, G139, B139, C140, E140, G140, B140, C141, E141, G141, B141, C142, E142, G142, B142, C143, E143, G143, B143, C144, E144, G144, B144, C145, E145, G145, B145, C146, E146, G146, B146, C147, E147, G147, B147, C148, E148, G148, B148, C149, E149, G149, B149, C150, E150, G150, B150, C151, E151, G151, B151, C152, E152, G152, B152, C153, E153, G153, B153, C154, E154, G154, B154, C155, E155, G155, B155, C156, E156, G156, B156, C157, E157, G157, B157, C158, E158, G158, B158, C159, E159, G159, B159, C160, E160, G160, B160, C161, E161, G161, B161, C162, E162, G162, B162, C163, E163, G163, B163, C164, E164, G164, B164, C165, E165, G165, B165, C166, E166, G166, B166, C167, E167, G167, B167, C168, E168, G168, B168, C169, E169, G169, B169, C170, E170, G170, B170, C171, E171, G171, B171, C172, E172, G172, B172, C173, E173, G173, B173, C174, E174, G174, B174, C175, E175, G175, B175, C176, E176, G176, B176, C177, E177, G177, B177, C178, E178, G178, B178, C179, E179, G179, B179, C180, E180, G180, B180, C181, E181, G181, B181, C182, E182, G182, B182, C183, E183, G183, B183, C184, E184, G184, B184, C185, E185, G185, B185, C186, E186, G186, B186, C187, E187, G187, B187, C188, E188, G188, B188, C189, E189, G189, B189, C190, E190, G190, B190, C191, E191, G191, B191, C192, E192, G192, B192, C193, E193, G193, B193, C194, E194, G194, B194, C195, E195, G195, B195, C196, E196, G196, B196, C197, E197, G197, B197, C198, E198, G198, B198, C199, E199, G199, B199, C200, E200, G200, B200, C201, E201, G201, B201, C202, E202, G202, B202, C203, E203, G203, B203, C204, E204, G204, B204, C205, E205, G205, B205, C206, E206, G206, B206, C207, E207, G207, B207, C208, E208, G208, B208, C209, E209, G209, B209, C210, E210, G210, B210, C211, E211, G211, B211, C212, E212, G212, B212, C213, E213, G213, B213, C214, E214, G214, B214, C215, E215, G215, B215, C216, E216, G216, B216, C217, E217, G217, B217, C218, E218, G218, B218, C219, E219, G219, B219, C220, E220, G220, B220, C221, E221, G221, B221, C222, E222, G222, B222, C223, E223, G223, B223, C224, E224, G224, B224, C225, E225, G225, B225, C226, E226, G226, B226, C227, E227, G227, B227, C228, E228, G228, B228, C229, E229, G229, B229, C230, E230, G230, B230, C231, E231, G231, B231, C232, E232, G232, B232, C233, E233, G233, B233, C234, E234, G234, B234, C235, E235, G235, B235, C236, E236, G236, B236, C237, E237, G237, B237, C238, E238, G238, B238, C239, E239, G239, B239, C240, E240, G240, B240, C241, E241, G241, B241, C242, E242, G242, B242, C243, E243, G243, B243, C244, E244, G244, B244, C245, E245, G245, B245, C246, E246, G246, B246, C247, E247, G247, B247, C248, E248, G248, B248, C249, E249, G249, B249, C250, E250, G250, B250, C251, E251, G251, B251, C252, E252, G252, B252, C253, E253, G253, B253, C254, E254, G254, B254, C255, E255, G255, B255, C256, E256, G256, B256, C257, E257, G257, B257, C258, E258, G258, B258, C259, E259, G259, B259, C260, E260, G260, B260, C261, E261, G261, B261, C262, E262, G262, B262, C263, E263, G263, B263, C264, E264, G264, B264, C265, E265, G265, B265, C266, E266, G266, B266, C267, E267, G267, B267, C268, E268, G268, B268, C269, E269, G269, B269, C270, E270, G270, B270, C271, E271, G271, B271, C272, E272, G272, B272, C273, E273, G273, B273, C274, E274, G274, B274, C275, E275, G275, B275, C276, E276, G276, B276, C277, E277, G277, B277, C278, E278, G278, B278, C279, E279, G279, B279, C280, E280, G280, B280, C281, E281, G281, B281, C282, E282, G282, B282, C283, E283, G283, B283, C284, E284, G284, B284, C285, E285, G285, B285, C286, E286, G286, B286, C287, E287, G287, B287, C288, E288, G288, B288, C289, E289, G289, B289, C290, E290, G290, B290, C291, E291, G291, B291, C292, E292, G292, B292, C293, E293, G293, B293, C294, E294, G294, B294, C295, E295, G295, B295, C296, E296, G296, B296, C297, E297, G297, B297, C298, E298, G298, B298, C299, E299, G299, B299, C300, E300, G300, B300, C301, E301, G301, B301, C302, E302, G302, B302, C303, E303, G303, B303, C304, E304, G304, B304, C305, E305, G305, B305, C306, E306, G306, B306, C307, E307, G307, B307, C308, E308, G308, B308, C309, E309, G309, B309, C310, E310, G310, B310, C311, 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E394, G394, B394, C395, E395, G395, B395, C396, E396, G396, B396, C397, E397, G397, B397, C398, E398, G398, B398, C399, E399, G399, B399, C400, E400, G400, B400, C401, E401, G401, B401, C402, E402, G402, B402, C403, E403, G403, B403, C404, E404, G404, B404, C405, E405, G405, B405, C406, E406, G406, B406, C407, E407, G407, B407, C408, E408, G408, B408, C409, E409, G409, B409, C410, E410, G410, B410, C411, E411, G411, B411, C412, E412, G412, B412, C413, E413, G413, B413, C414, E414, G414, B414, C415, E415, G415, B415, C416, E416, G416, B416, C417, E417, G417, B417, C418, E418, G418, B418, C419, E419, G419, B419, C420, E420, G420, B420, C421, E421, G421, B421, C422, E422, G422, B422, C423, E423, G423, B423, C424, E424, G424, B424, C425, E425, G425, B425, C426, E426, G426, B426, C427, E427, G427, B427, C428, E428, G428, B428, C429, E429, G429, B429, C430, E430, G430, B430, C431, E431, G431, B431, C432, E432, G432, B432, C433, E433, G433, B433, C434, E434, G434, B434, C435, E435, G435, B435, C436, E436, G436, B436, C437, E437, G437, B437, C438, E438, G438, B438, C439, E439, G439, B439, C440, E440, G440, B440, C441, E441, G441, B441, C442, E442, G442, B442, C443, E443, G443, B443, C444, E444, G444, B444, C445, E445, G445, B445, C446, E446, G446, B446, C447, E447, G447, B447, C448, E448, G448, B448, C449, E449, G449, B449, C450, E450, G450, B450, C451, E451, G451, B451, C452, E452, G452, B452, C453, E453, G453, B453, C454, E454, G454, B454, C455, E455, G455, B455, C456, E456, G456, B456, C457, E457, G457, B457, C458, E458, G458, B458, C459, E459, G459, B459, C460, E460, G460, B460, C461, E461, G461, B461, C462, E462, G462, B462, C463, E463, G463, B463, C464, E464, G464, B464, C465, E465, G465, B465, C466, E466, G466, B466, C467, E467, G467, B467, C468, E468, G468, B468, C469, E469, G469, B469, C470, E470, G470, B470, C471, E471, G471, B471, C472, E472, G472, B472, C473, E473, G473, B473, C474, E474, G474, B474, C475, E475, G475, B475, C476, E476, G476, B476, C477, E477, G477, B477, C478, E478, G478, B478, C479, E479, G479, B479, C480, E480, G480, B480, C481, E481, G481, B481, C482, E482, G482, B482, C483, E483, G483, B483, C484, E484, G484, B484, C485, E485, G485, B485, C486, E486, G486, B486, C487, E487, G487, B487, C488, E488, G488, B488, C489, E489, G489, B489, C490, E490, G490, B490, C491, E491, G491, B491, C492, E492, G492, B492, C493, E493, G493, B493, C494, E494, G494, B494, C495, E495, G495, B495, C496, E496, G496, B496, C497, E497, G497, B497, C498, E498, G498, B498, C499, E499, G499, B499, C500, E500, G500, B500, C501, E501, G501, B501, C502, E502, G502, B502, C503, E503, G503, B503, C504, E504, G504, B504, C505, E505, G505, B505, C506, E506, G506, B506, C507, E507, G507, B507, C508, E508, G508, B508, C509, E509, G509, B509, C510, E510, G510, B510, C511, E511, G511, B511, C512, E512, G512, B512, C513, E513, G513, B513, C514, E514, G514, B514, C515, E515, G515, B515, C516, E516, G516, B516, C517, E517, G517, B517, C518, E518, G518, B518, C519, E519, G519, B519, C520, E520, G520, B520, C521, E521, G521, B521, C522, E522, G522, B522, C523, E523, G523, B523, C524, E524, G524, B524, C525, E525, G525, B525, C526, E526, G526, B526, C527, E527, G527, B527, C528, E528, G528, B528, C529, E529, G529, B529, C530, E530, G530, B530, C531, E531, G531, B531, C532, E532, G532, B532, C533, E533, G533, B533, C534, E534, G534, B534, C535, E535, G535, B535, C536, E536, G536, B536, C537, E537, G537, B537, C538, E538, G538, B538, C539, E539, G539, B539, C540, E540, G540, B540, C541, E541, G541, B541, C542, E542, G542, B542, C543, E543, G543, B543, C544, E544, G544, B544, C545, E545, G545, B545, C546, E546, G546, B546, C547, E547, G547, B547, C548, E548, G548, B548, C549, E549, G549, B549, C550, E550, G550, B550, C551, E551, G551, B551, C552, E552, G552, B552, C553, E553, G553, B553, C554, E554, G554, B554, C555, E555, G555, B555, C556, E556, G556, B556, C557, E557, G557, B557, C558, E558, G558, B558, C559, E559, G559, B559, C560, E560, G560, B560, C561, E561, G561, B561, C562, E562, G562, B562, C563, E563, G563, B563, C564, E564, G564, B564, C565, E565, G565, B565, C566, E566, G566, B566, C567, E567, G567, B567, C568, E568, G568, B568, C569, E569, G569, B569, C570, E570, G570, B570, C571, E571, G571, B571, C572, E572, G572, B572, C573, E573, G573, B573, C574, E574, G574, B574, C575, E575, G575, B575, C576, E576, G576, B576, C577, E577, G577, B577, C578, E578, G578, B578, C579, E579, G579, B579, C580, E580, G580, B580, C581, E581, G581, B581, C582, E582, G582, B582, C583, E583, G583, B583, C584, E584, G584, B584, C585, E585, G585, B585, C586, E586, G586, B586, C587, E587, G587, B587, C588, E588, G588, B588, C589, E589, G589, B589, C590, E590, G590, B590, C591, E591, G591, B591, C592, E592, G592, B592, C593, E593, G593, B593, C594, E594, G594, B594, C595, E595, G595, B595, C596, E596, G596, B596, C597, E597, G597, B597, C598, E598, G598, B598, C599, E599, G599, B599, C600, E600, G600, B600, C601, E601, G601, B601, C602, E602, G602, B602, C603, E603, G603, B603, C604, E604, G604, B604, C605, E605, G605, B605, C606, E606, G606, B606, C607, E607, G607, B607, C608, E608, G608, B608, C609, E609, G609, B609, C610, E610, G610, B610, C611, E611, G611, B611, C612, E612, G612, B612, C613, E613, G613, B613, C614, E614, G614, B614, C

## Model Exercise.

39.

Count: 1 2 1 2 etc.

The drop-method may then be employed in playing all the different scales with the different fingers, the playing finger being pushed forward towards the keys a little more than the other fingers, in order to prevent the latter from interfering with the keys.

Model Exercises, particularly for the mordent:

40.

Count: 1 2 1 2 etc.

All the exercises here given should be played in various degrees of strength, commencing with pianissimo and ending with fortissimo, in order to develop the sensation of the weight perceived in executing the various types of drops of the arm as heretofore described.

## Studies and Recitations for the drop of the arm.

### a) With Accentuated Notes.

Schytte, op. 160 No. 19. Study (Notes with the sign >).

Czerny, op. 261 No. 71. Study (Mordents).

Czerny, op. 849 No. 17. Study (Mordents).

— -Germer, part IV, No. 4. Study (Mordents).

Mendelssohn, "Variations sérieuses" No. 13 (Notes marked sf).

Chopin, op. 25 No. 9. Study (Notes with the sign >).

Skrjabin, op. 11 No. 6. Prelude (Notes with the sign >).

### b) For Legato Playing in Sixths and Octaves.

(See studies and recitations for the hand stroke).

## 2. Pressure.

In piano playing we understand by "pressure" a movement by means of which the mass of the whole arm depresses the keys without previously being swung upwards. The characteristic of pressure as contrasted with other movements is the absence of the upward swing of the arm. The shoulder joint forms a point of support for all the joints of the arm in executing the pressure movement. In applying the pressure method of playing all the fingers must be brought into the proper positions beforehand, they must then touch the keys, and the latter must be depressed by the pressure of the entire arm upon the fingers. Immediately after the keys have been depressed the arm must be brought into the passive state again, in order to avoid superfluous waste of energy and fatigue. Physiologically speaking, pressure-playing consists only in tension of the flexors of the upper arm and of the shoulder, under absence of the upward swing of the arm. The strength of tone produced by this method of playing may vary considerably; all degrees of strength of tone can thus be produced, from pianissimo to fortissimo. Here the strength of tone depends entirely on the speed with which the keys are depressed; when depressed slowly the tone produced will be soft, when depressed quickly, it will be loud.



Pressure playing is employed particularly in playing the chords in slow time measure; when the chords are more rapid it is advisable to resort to the forearm and upper-arm strokes (cf. Chopin, op. 40 No. 2. Polonaise).

Pressure playing is also to be recommended for fixation of the striking mass of the arm, as mentioned by us above in part II, chapter II.

Finally, it will be noted that this form of tone production is never accompanied by a rattling of the keys when they are depressed.

### Model Exercises.

Count: "One (= press), two (= move the arm and prepare for the next pressure)"; M.M.  $\text{♩} = 60$ .

41.

Count: 1 2 1 2 1 etc. etc.

Vertical fingering diagrams (from left to right):

- System 1 Treble: 5, 3, 4, 2, 3, 1
- System 1 Bass: 1, 3, 2, 4, 3, 5
- System 2 Treble: 5, 3, 2, 1, 4, 2, 1, 3, 2, 1
- System 2 Bass: 1, 3, 5, 1, 2, 4, 5, 1, 2, 3, 4, 5

According to the foregoing formula practise also all the

major and minor triads and the chords of the dominant and diminished sevenths with their inversions.

### Studies and Recitations for pressure-playing.

Chorales, edited by Dörffel.

Schumann, op. 68. Choral.

Behr, Prière muette (Silent Prayer).

Pachulsky, op. 23 No. 1. Dans la chapelle (In the Chapel).

Tschaikowsky, op. 39 No. 24 A l'église (At Church).

Grieg, Åses' Death.

Chopin, op. 28 No. 21. Prelude.

Tschaikowsky, op. 40 No. 2. Chanson triste (Sad Song).

Händel, Largo.

Hummel, Romance (for the left hand alone).

Chopin, op. 15 No. 3. Nocturne (intermediate part).

—, op. 37 No 1. Nocturne (intermediate part).

Liszt, Consolations Nos. 1 & 4.

Rubinstein, op. 3 No. 1. Melody.

Arensky, op. 34 No. 3. Les larmes (Tears).

Borodine, Au couvent (In the Convent) I. part.

Sibelius, op. 58 No. 10. Summer Song.

Chopin, op. posth. Study in A $\flat$ -major.

Rachmaninoff, op. 3 Prelude (I. & III. parts).

## VI. SUMMARY OF PIANO-TECHNICAL MATERIAL

### 1. The Forms of Tone-Production.

We have seen above that the stroke (see page 44) involves an alternate tension of the extensors and the flexors in raising and lowering the striking mass. In dropping the arm (p. 96), the extensors alone are employed for lifting the weight of the arm, whence the entire mass drops by virtue of the action of gravity. In the pressure (p. 101), finally, the flexor muscles alone are tightened when the mass of the arm depresses the keys, without having been previously lifted.

These **different physiological processes**, i. e. the alternating active and passive states of the muscles characterize the three

forms of tone production which we have discussed: the **stroke**, the **drop of the arm**, and the **pressure**.

Based on physiological facts, the forms of tone production considered by us may be defined as follows:

The **stroke** consists in alternating the active state of the extensors (stretching muscles) and flexors (bending muscles), i. e. in lifting and lowering.

The **drop** of the arm consists in alternating the active state of the extensors with the passive state of the flexors (swing and drop in the exact sense of the words).

The **pressure** consists in alternating the passive state of the extensors with the active state of the flexors (absence of the swing and pressure).

## 2. The Movements of the Arm in the Execution of the Various Technical Styles of Piano Playing.

In part II, chapter 1, (page 42) we showed that piano playing involves all the movements that the arm is capable of performing by virtue of its anatomical structure. Considering these movements with reference to the various styles of technical execution, it must be borne in mind that, according to direction, three kinds of movements of the arm must be distinguished, namely: stretching and bending, adduction and abduction, and rotation.

Stretching and bending is possible in the joints of the fingers, hand, elbow, and shoulder. This action occurs in piano playing with all the three forms of tone production that have been considered by us, i. e. in performing the stroke, the drop of the arm, and the pressure. In particular, these movements correspond to the finger, hand, forearm, and upper-arm strokes. Stretching and bending take place even in the finger phalanges, namely, in the different kinds of finger motions, although the finger phalanges do not form independent striking masses by themselves (see part II, chapter II, page 45).

Adduction and abduction are possible in the joints



of the knuckles, wrist, and shoulder; in piano playing it occurs, generally, when the arm moves from one part of the keyboard to another. In particular, it occurs in knuckle joints in the different finger motions, in the wrist joint when passing the thumb under the fingers or the fingers over the thumb, and in the shoulder joint when transferring the arm.

Rotation, finally, is only possible in the elbow and shoulder joints; in piano playing the rolling actions of the upper arm and forearm correspond to this action.

From what has been stated in this chapter it may be inferred that piano playing involves **all the three physiologically possible forms of producing the tone, and all the anatomically possible movements of the arms.** All the three forms of tone production, and each movement performed, have a certain definite significance in piano playing.

### 3. The Actions of the Shoulder and Upper-Arm Muscles in Piano Playing.

We must first of all make clear in which of the different styles of technical execution participate the shoulder and upper-arm muscles, and what rôle they play in each separate case.

Above all, the finger-stroke playing methods must be considered only from the point of view of actual practical application, as the modern piano pedagogy declines isolated finger technique (see page 69); the practical means employed are the weight of the arm, the rolling action, and the combined arm-swing, and each of these means involves the respective muscles of the shoulder and upper arm as follows.

In weighted playing the shoulder and upper-arm muscles are relaxed, thus adding the weight of the arm to the finger stroke; this yields increased strength of tone, improved endurance of the fingers, uniformity of tonal volume, and maximum legato in piano playing.

In the rolling action the shoulder and upper-arm muscles add the force of rotation to the stroke of the fingers, thereby increasing the strength of tone and promoting velocity.

In the combined arm-swing the shoulder and upper-arm muscles add the arm-swing to the stroke of the fingers, the result being an increased tone volume.

In the forearm and upper-arm strokes the shoulder and upper-arm muscles raise and lower the corresponding striking masses.

In the motion of the entire arm on the piano when passing the thumb under the fingers, or the fingers over the thumb, the shoulder and upper-arm muscles tend to uniformize the motion of the entire arm.

In the transfer the shoulder and upper-arm muscles move the arm quickly and with assurance over long distances.

In the arm-drop the shoulder and upper-arm muscles swing the mass of the arm upwards; the subsequent relaxation causes the raised arms to drop by their own weight.

In the pressure the shoulder and upper-arm muscles lower the mass of the entire arm.

It is known from physiology that the greater the number of participating muscles and the larger their size are the later will the fatigue begin. A considerable part of the work performed by the small muscles is distributed over the larger muscles, in consequence of which the participation of the upper-arm and shoulder muscles materially improves the endurance of pianists.

It follows from this that the shoulder and upper-arm muscles are employed in nearly all styles of technical execution, and from a point of view of mechanics of piano technique, they must even be regarded as the essential source of power. Virtuoso playing requires the expenditure of considerable energy, and without the proper exploitation of the upper-arm and shoulder muscles the piano virtuosi would be incapable of carrying through long and complicated compositions. It is in this sense that E. du Bois-Reymond states that Liszt and Rubinstein without iron muscles systems would be inconceivable, and that

the bowing work performed by Joachim for one symphony corresponds to many foot-pounds, or poundals.

It is clear that the significance of the shoulder and upper-arm muscles makes it exigent to exploit them as much as possible in piano playing. This is achieved as follows.

One of the primary requisites is to keep the arm from hanging down, particularly the upper arm, as in the latter position



Fig. 26. Position of the upper-arm.

its state of muscular tension is more or less indifferent, and indifferent states in piano playing should be altogether avoided. Moreover, the arms should under no circumstances be pressed against the body, as this involves an elimination of the activity of the shoulder and upper-arm muscles, and the performer is forced to resort to isolated finger technique. Nor should the shoulders be drawn up, because this also impairs their activity. Hence, throughout the performance, the arm should be kept resistively, massively compact, and at the same time the muscles should be kept at a minimum tension (see fig. 26), by keeping the upper arm slightly removed from the body.



The same result is obtained by slow execution of the upper-arm strokes in their maximum magnitudes (see part II, chapter II), and of the arm-transfer movements (see part II, chapter IV, 2). Finally, to strengthen the muscles of the upper-arm and shoulder, certain exercises without the instrument may be performed, e. g. slow circular movements with the entire arm, exercises with dumbbells, drawing up on the bars, etc. Such gymnastic exercises were also prescribed by the well-known piano pedagogue Deppe for his pupils.

## VII. THE PEDAL

In using the pedal it is important to place the foot so that the heel rests firmly on the floor. Lifting and lowering of the pedal must be carried out so that the foot constantly remains in touch with the pedal; this is necessary to achieve sufficient speed in operating the pedal, and in order to be ready to use it whenever necessary. Lifting and lowering of the pedal must be performed quickly. All these remarks pertain to both pedals. We now proceed to explain the use of the pedals.

The right-hand pedal enables the player to extend the duration of the sound, to bind successive tones, to increase the force of tone of a series of notes, and to preserve the harmony. In applying it, the performance must be very accurate, and the operation of the pedal carefully executed, i. e. the tones must not be sustained too long, nor must they be allowed to break off too soon. The general rule is, to change the right-hand pedal when the chord is changed; but there are many exceptions to this rule. It is safest to be guided solely by the sense of hearing in the use of the pedal. Acoustic conditions must of course also be taken into consideration, such as the size of the room, and its equipment.

From the preceding it will be seen that accurate operation

of the pedal is connected with considerable difficulties. Only comparatively long experience can teach the proper use of the pedal, and the performer must have a certain instinct for the moments in which the pedal should be used.

There are two chief kinds of applications of the pedal: the simultaneous and the retarded uses.

The simultaneous pedalling is the operation of the pedal in the moment in which the chord is struck, the pedal being raised as soon as the moment of striking is over. This pedalling generally is employed when the succession of tones is not to be slurred or tied. Especially in staccato playing the pedal is depressed for a very brief time, while in portamento playing it is kept depressed somewhat longer.

#### Model Exercise.

Count: "One (= lower the pedal and raise it again), two (= hold pedal at rest)"; M.M. ♩ = 60.

42.

Count: 1 2 1 2 etc.

$P$   $P$   $P$   $P$

In retarded pedalling, the operation of the pedal takes place after the chord has been struck, the pedal being raised again as soon as the striking of the next chord commences. Owing to the fact that the pedal is not depressed until the chord is struck, the latter at the same time being sustained by the fingers, the tones of the previous chord do not sound together with the next; whereas, by raising the pedal at the moment of striking the second chord, a perfect legato playing is achieved. In particular in playing accompaniments, care must be exercised that the harmonic basis formed by the bass notes is not destroyed, i. e. the hand should not be removed from the bass notes until the pedal is fully depressed.

## Model Exercise.

Count: "One (= raise pedal), two (= lower pedal), three, four (= keep pedal down)"; M.M. ♩ = 60.

43.

Count: 1 2 3 4 1 2 3 4 1 2 3 4 1

1 2 3 4 1 2 3 4 etc.

In the first chord of the first bar the simultaneous pedal operation may also be resorted to, as there is no danger of simultaneous sounding of undesirable tones. In the last chord of the last bar, however, the pedal also sustains the fermato, and finally, pedal and hands are raised at the same time.

Besides these fundamental pedal operations there are several other special kinds of operations by means of which various musical effects can be produced; they are collectively called *colouring pedal-operations*. We consider only a few selected examples.

**First Example.** We depress the right-hand pedal, and then strike any chord so that a low bass-note is sounded by the left hand, while the right hand plays a chord in a medium or high pitch; then both hands are lifted off the keyboard. If, now, the pedal is lifted only partially, the low bass-note continues to sound, while the chord in the medium or high register ceases to be audible. The effect is achieved as follows:



The pads of the dampers, which cause the vibrating strings to cease their vibrations upon coming into contact with them, are of different shapes. If the string is triple, as is the case in the medium or high register, the damper is flat, while if the string is double (in the bass) it is wedge-shaped; finally, the single-string dampers of the contra-octave have a wedge-shaped incision. When the pedal is lifted, i. e. when its effect is stopped, the dampers of the high strings touch their respective strings sooner than the others, and hence, if the pedal is kept slightly depressed, i. e. only sufficiently to stop the vibrations of the upper strings, the lower ones which have not yet been touched by their dampers, will continue to vibrate, and therefore their tones will continue to be audible.

This is usually termed as *semi-pedal*. It should be employed when changing chords of the upper or medium ranges but without destroying the tone produced in the bass, which cannot be sustained by hand. It can be applied several times to one and the same note. See, e. g. Bach-Liszt, Organ Prelude in A-minor.

*Second Example.* Sometimes the semi-pedal is applied through several bars, at such speed and with such frequency, that the impression produced is that of a rapid trembling of the pedal (hence the name: *vibrating pedal*); in this case considerably less care need be exercised in changing the pedal, as all the required keys are kept depressed by the hands. The musical effect thus produced bears a remarkable resemblance to that of the organ, and hence this style of pedal operation is frequently employed in playing organ compositions rearranged for piano.

*Third Example.* Depress the right-hand pedal, and depress with the left hand any key in the low bass, without sounding its tone; then with the right hand play any scale or glissando on the whole keyboard; finally, raise the pedal with the last note of the scale or glissando at the same time keeping the key in the bass depressed. The result will be that, instead of hearing the tone of the depressed key which has not been sounded, an entire chord will be heard, which consists of the

natural harmonic overtones of the tone of the depressed key, and the acoustic effect is similar to that of a distant echo or choir. Thus, if the bass C is depressed without sounding it, the following series of overtones will be heard:



The last tone B flat, and the higher harmonic overtones are scarcely audible at all, so that the general effect will be that produced by a major triad. The explanation for this phenomenon is given below.

It is known from physics that the sounds of the musical instruments and of the human voice consist of a fundamental tone which is especially clearly defined, and a series of weaker harmonic overtones. In playing a scale or a glissando while the pedal is kept depressed, the vibrations of the air make the string belonging to the depressed key vibrate as well. When the pedal is raised after playing the scales or glissando, the dampers stop the vibrations of all the strings excepting that where the key is kept depressed; hence this free string continues to vibrate and to produce tones. If the tone is produced by striking the string with the felt hammer operated by the corresponding key, the fundamental tone exceeds in strength all the harmonic overtones, so that the latter are scarcely audible. If, however, the key is kept depressed without the string having been struck by the hammer, the fundamental tone does not stand out and the overtones are clearly audible.

A still stronger effect is achieved if, instead of one key, an entire chord in the bass or tenor is struck without being sounded, i. e. if the corresponding keys are slowly depressed. Thus a major triad or a dominant chord may be struck in this mute manner, and when the pedal is raised after playing a scale or glissando, the strings of this chord will remain free, and the harmonic overtones of the fundamental tone will become audible. According to well known acoustic laws these strings will start to vibrate, and clearer overtones will thus be produced.

**F o u r t h E x a m p l e.** If an organ point is marked in the bass, a whole series of different chords sounded while the pedal



is kept depressed produce no sharply defined dissonance. This is due to the circumstance that the harmonic overtones of the corresponding bass tone are present. As the bass strings are the longest, they contain a larger number of harmonic overtones, as compared with the strings of the higher pitch; hence in the organ point all the dissonances theoretically produced are automatically dissolved into consonances. The greater the distance between the bass note and the chords which are struck, the more agreeable are the sounds produced, as the overtones become more sharply defined.

**Fifth Example.** Without changing the pedal a number of chords or an arbitrary passage consisting of dissonant sounds, such as the chromatic scale, may be played, provided only that a constant crescendo is observed and the pedal is raised when the last, most strongly played note is sounded. In this case also, the effect is not dissonant, as the crescendo causes each subsequent sound to be more audible than the previous ones, so that the ultimate effect is that of drowning the preceding tones. Particularly strong impressions can be produced in this way by increasing the sound when playing scales with both hands and with the pedal depressed, commencing in pianissimo (depressing the left pedal), and ending in fortissimo; in executing this it is essential to have at least one fundamental bass tone, or, better still, a bass chord. For instance: Chopin, op. 23. Ballad.



**Sixth Example.** Finally, the right-hand pedal may be employed, either by depressing it entirely, or by employing it



as semi-pedal, to produce the effect of increased tone volume or, in the latter case, to produce softer tones.

It is useful to observe that the effect of the right-hand pedal is particularly strong in the low bass register, where the long, thick strings vibrate; the more the upper register is approached, the less the effect of the pedal, as here the short and thin strings vibrate; in the highest register there is no pedal effect at all, because there are no corresponding dampers.

In recent times the Steinway firm has commenced to instal a special third pedal, a so-called *p r o l o n g a t i o n* pedal, by the aid of which certain notes of the medium and lower ranges may be sustained independently of the operation of the other two pedals. This pedal is of course of extreme usefulness for various kinds of colouring, and musical effects hitherto unknown can be achieved with it.

The *l e f t - h a n d*, or *s o f t* pedal also plays an independent part of significance in piano playing. It may be employed to reduce the tonal volume of the instrument; at the same time the tone colouring becomes more dull.

It is regrettable that in the large majority of contemporary editions of compositions the use of the right pedal is indicated inadequately. The left and colouring pedals are only rarely indicated at all, their effective application being left entirely in the hands of the more or less experienced or intelligent performer.

## **VIII. PRACTICAL ARRANGEMENT OF THE VARIOUS STYLES OF TECHNICAL EXECUTION WITH INSTRUCTIONS FOR THEIR ACQUISITION. THE INSTRUMENT**

In the foregoing we have considered the technical styles of execution in an order which enabled us to present the entire material employed for piano technique in a certain definite system; this was necessary in the interests of a lucid demonstration. The practical arrangement of the various styles of execution and their acquisition must, however, be different;

the fundamental technical styles must come first, namely, those which are of general importance; the other special technical styles which have a more or less secondary significance for the general practice, must come last.

First of all the neophyte must be made familiar with the general concepts of active and passive states of the arms. This concept of the opposite states of the sets of muscles should form the point of departure for all further studies.

It will then be necessary to fix the mass of the arm, i. e. to improve the compactness and massivity by eliminating all superfluous movements. To achieve this, chords should be exercised according to the pressure method, the fingers and the hand being kept bent, concave. Of course, beginners should not play too many notes in chords. Double thirds and sixths in C-major may be recommended for playing with the same fingers, namely 1st and 3rd, 2nd and 4th, 3rd and 5th in thirds, 1st and 5th in sixths. Furthermore, it will be useful to let the student play triads and chords of the dominant sevenths with all their inversions (see part II, chapter V, 2).

After the fixation of the arm has been successfully carried through, the large upper arm and shoulder muscles must be exercised. For this purpose slow upper-arm strokes and transfer motions of the arms to the maximum of extent should be prescribed. This style should be practised no more than is necessary to achieve preliminary rough results, which may be done in a few lessons. The detailed training in these technical styles must be postponed until later.

Then the various styles of finger strokes must be acquired. As soon as some knowledge of these styles has been gained, the weighted playing should be commenced. In learning to perform the weighted style of playing, the higher degrees of weight should be commenced with, and the lower ones introduced gradually, as the necessary sensations of weight in the arm are the more readily acquired when the weights are kept as high as possible in the beginning.

After the finger-stroke playing has been successfully mastered, the transfer motions of the mass of the arm by

means of the passing-under of the thumb and the passing-over of the fingers must be taken up.

Thereafter, according to requirements and circumstances, the rolling action, the hand, forearm, and upper-arm strokes, and the transfer-motions of the arms may be taught; in other words, the styles of technical performance that occur most frequently in practice.

Finally, the remaining styles may be considered, such as repeated notes, the drop of the arm, the finger-staccato, and the combined arm-swing. When studying the drop of the arm, commence with the dropping of the maximum weight, and gradually reduce it until the minimum range has been reached. The reasons are the same as those given for commencing with maximum weighted playing.

Moreover, an early familiarity with the pedal will be very useful; this part should never be postponed until the very last, but should be taken up after some of the rudiments of technique have been acquired. It is only natural to commence with the simplest examples, and to progress gradually to the more complicated phases.

We shall now discuss the methods to be adopted in studying the various styles of technical execution. It was mentioned previously (page 14) that in practising, the ultimate aim should be the conscious acquisition of sensations in the entire arm, by means of which the various groups of muscles are coordinated, i. e. brought to operate in accordance with intention and volitional impulses. For this purpose, the incipient technical exercises should be performed with extreme care and maximum of extent, with a view to acquire the sensations essential for accomplished execution. It is advisable to perform each movement rapidly in exercises, as this promotes strengthening of the muscles more than slow actions. The intervals between the various movements should be as great as possible, and each of the movements made should be seriously contemplated in detail during these pauses (*Denkpausen*), in order to gain a conscious perception of the sensations.



Later on all these intervals for contemplation may be reduced to a minimum. Good pianists are capable of performing various technical styles within the range of the raised and depressed key.

All exercises should first be performed with each hand separately, and later on with both hands simultaneously. The hands should initially be kept about one or two octaves distant one from another.

All exercises and studies should at first be played *piano*. The muscles must be strengthened gradually, and hence the work performed with them should at first be easy; when they have gained in strength, loud playing may be turned to. If the exercises are commenced with *forte* playing, the weak, insufficiently trained finger muscles are overtired, and the result may be excessive fatigue. Furthermore, if exercises are played too loudly at first, our attention is concentrated chiefly on increasing the strength of tone instead of on the acquisition of the necessary sensations of motions, which forms the primary object of all exercising; in short, *forte* playing distracts our attention from the direct aim of our studies. Finally, loud practising impedes our observation of the result of our activities, i. e. it is more difficult to hear what is being played. The reason is of course, that *forte* playing tends to concentrate our attention on increasing the tonal force, and not on the perception of the effect of the tones produced (see also page 123).

It is advisable to carry out all technical styles on a table or on the cover of the closed piano at first. If they are immediately performed on the piano, the fear of missing the proper keys as well as the process of lowering them, frequently misdirect our attention, while the technical execution on a table or on the piano-cover facilitates the acquisition of motory sensations.

Finally, the acquisition of the proper sensations in executing the separate technical styles, is promoted by practising with the eyes closed, as this increases the concentration upon the movements of the arm and the tones produced.

In this connection, a few general hints concerning the

conditions under which the mastery of all the arm movements appears most convenient, may be given.

One of the essential conditions is the proper position of the body; the player should sit in the centre before the keyboard, with his body slightly inclined towards the instrument, and with the front part of the chair occupied only. It is necessary to observe that the elbows are at about the same level as the keys, or slightly lower, for the following reasons:

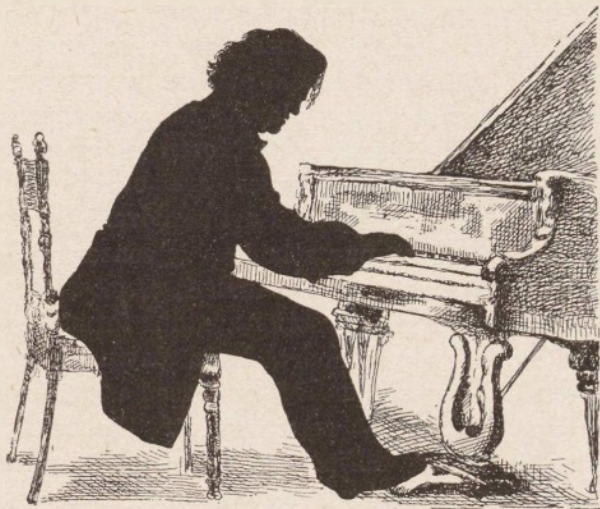


Fig. 27. General position of the body (Anton Rubinstein).

The lower the seat, the more the arms are bent at the elbow joint, and this facilitates striking the keys with the finger tips; when the seat is too high, the arms must be stretched out and there is a tendency to strike the keys with the outstretched fingers, which must be scrupulously avoided. Secondly, if the seat is low, the arm will the more easily be brought into the passive state, which, as we have seen, is of especial importance for modern piano technique, particularly as far as weighted playing is concerned. Thirdly, a low seat causes the arm to discard the indifferent state, and the large shoulder and upper-arm muscles commence to operate (see part II, chapter VI, 3). For these reasons some piano-builders

have commenced to make the feet of the pianos somewhat higher than usual.

Finally, when practising without the pedal, the entire surface of the bottom of the feet must be kept firmly on the floor, while, when the pedal is used, only the heels are kept fixed on the floor. If the feet of the pupil fail to reach the ground, a little bench for them must be supplied.

Figure 27 represents a model position of the body while playing the piano, with respect to the height of the seat and the position of the feet, as well as to the general position which facilitates all the necessary movements of the arms.

When performing technical exercises and studies, a certain definite and systematic fingering must be adopted and adhered to without deviation; this we mentioned before, in the chapter on the motoric memory (see page 38). We do not consider it superfluous to indicate the practical rules which have been tried out in innumerable instances, and by the aid of which the pupil may work out a system of fingering.

1. Employ the standard fingering of arpeggios and scales.
2. Strike the same notes if possible, with the same fingers, with the exception of repeated notes (repetitions), in which the strokes are performed by different, as a rule adjoining fingers.
3. Use adjoining fingers for playing adjoining notes; when one or more keys are left out, leave out as many fingers as keys are left out in the diatonic order; the thumb forms the only exception to this rule, as it permits leaving out several keys between it and the second finger.
4. Sequences and all repeatedly occurring figures and phrases should as far as possible be carried out with the same fingers, i. e. in the same order of occurrence, and independently of whether the keys are white or black.
5. There is no objection to strike black keys with the thumb, excepting when playing passages of the character of scales and arpeggios.
6. When playing chords, mark the fingering beforehand,





Another point to be attended to is the uniformity of tone in the various registers, namely the upper, the medium, and the lower registers. Unfortunately the tones of the upper parts of the keyboard are generally extremely weak as compared with those of the lower ones.

The fullness of tone melodiousness, and timbre of the instrument should also be taken into consideration. We do not recommend instruments with shrill, metallic sound, but prefer those with dull-coloured sounds. In the former case the instruments fail to give sufficient aesthetic satisfaction, because the instruments with bright timbre refuse to yield strongly marked contrasts by reason of insufficient softness of tone, and of insufficient pianissimo. Moreover instruments with metallic timbre fail to remain constant in their acoustic properties; after some time they tend to produce shrill tones.

Finally, the pedals should receive some attention; it is essential that the pedals require only a minimum of movement in raising and lowering, as otherwise time and force will be wasted.

### The Relations between Technique and Artistic Interpretation.

All the styles of technical execution discussed by us, and which we have seen to be subordinate to our individual psychical activity, represent the store from which the means for artistic expression may be derived. This constitutes the relation that connects technique and artistic interpretation. Piano literature, especially the more recent compositions, place such high demands with respect to performance that there is no hope of mastering them even in part unless a certain store of technical ability is available. In the large majority of cases the understanding precedes the accomplishment, by reason of which the hands are incapable to produce what the intentions have meant to produce; unclear and floundered playing and insufficient velocity is the result, not to mention the absence of a soft, melodious tone. It is clear that a conscious mastery of tech-

nical capabilities is essential for the achievement of artistic ability.

In discussing the various styles of technical execution we pointed out their uses. These indications are, however, not to be understood as constituting a fixed and immutable dogma; in fact, the choice of the technical style employed must always depend to a certain degree upon the experience and the instinct of the performer. In many instances one and the same phrase may be performed equally well with different technical styles.

### T H E E A R A S I N S T R U M E N T O F C O N T R O L .

The instrument by means of which the connection between the psycho-mechanical activity on the one hand, and the result of this activity on the other, namely the artistic performance, can be controlled, is the ear. It is a regrettable fact that many players fail to hear what they are playing; they have no training in this, i. e. in hearing their own performance; all their attention is devoted to striking the proper keys, but the result of this activity remains almost unnoticed. Of course this concerns only persons endowed with a musical ear, as unmusical persons hardly apprehend any tones at all.

We are here chiefly concerned with a kind of division of attention, which is difficult for the beginner, as the psychical activity becomes more complicated. The player must attend to the keyboard first of all; the distances must be estimated with the eyes, and the arms adapted to these; in short, the player is forced to devote much time to the task of striking the correct keys. On the other hand the player must also perceive the tones produced, as he must have a certain control as to whether the tone production corresponds to his intention. This division of attention explains why it is much more difficult to observe one's own playing than that of the others: during one's own performance, the psychical activity is divided between the striking of the keys and the artistic rendition, while, in



listening to others the attention is devoted exclusively to the artistic element.

Complete correspondence between the tones produced and the intention can only be achieved by systematic and patient practice. From the first lessons on, the pupil must be instigated to adopt a critical attitude towards his own tone-production. Solfeggio exercises, musical dictation, playing in orchestras, and everything that tends to improve the sense of hearing, will be found useful for training this capacity.

At the same time everything that prevents the ear from controlling the tones produced, should be rigorously avoided, such as practising on a mute piano, on a bad instrument, with a metronome, and too loud practising.

It is clear that in practising on a m u t e p i a n o the result of the practising cannot be controlled.

The same negative results will be obtained with a p o o r q u a l i t y instrument. Unfortunately inferior instruments are widely distributed. On the other fields of music everyone endeavours to procure as perfect an instrument as possible, whereas in respect to pianos incredibly bad instruments are usually considered satisfactory, particularly for the first lessons. This is due not so much to the high price, as to the fact that the playing on an inferior piano is not as excruciating a torture as for instance the playing on a poor violin or any other string instrument.

Practising by m e t r o n o m e distracts the attention to such an extent that the pupil fails to hear anything but the beats of this instrument.

Too loud practising impairs the perception of the tones produced. Josef Hofmann states that it is unnecessary to practise very loud in order to gain a clear impression; the internal tension should replace the external expenditure of strength. The sense of hearing will be grateful for the observance of this rule.

Besides this general cause i. e. divided attention, there is another, more particular species, namely the construction of the piano mechanism. In playing a string instrument, or

in singing, the performer is forced to pay attention to the sound produced, as he must take into consideration an absolute as well as a relative tonal quality, namely, the pitch of the tone as well as its strength. In piano playing, on the other hand, only relative tonal quality is concerned, as the pitch is already given. Hence the pupil often tends to pay little attention to the matter of causing his tone production to correspond with his intentions.

Technical Analysis of Mendelssohn's "Variations sérieuses" and of Chopin's "Studies".

In conclusion we propose to analyse by way of example the "Variations sérieuses" by Mendelssohn and the "Studies" by Chopin, both of which are of considerable interest in artistic as well as in technical respect; all styles of technical execution are employed in their performance.

#### Mendelssohn's "Variations sérieuses".

Finger Stroke (legato). . .	Var. I (r. h.), II (both hands), VIII (r. h.), IX (both h.), X (both h.).
Finger Staccato . . . . .	Var. IV (both h.), XIII (r. h.).
Hand Stroke . . . . .	Var. III (both h., in piano).
Forearm Stroke . . . . .	Var. III (both h., in forte), V (both h.), XII (both h.), XVI
and	
Upper-Arm Stroke {	(l. h.), XVII (r. h. first, then l. h.), Final Part (both. h.).
Rolling Action . . . . .	Var. VIII (r. h.), IX (both h.), XVII (l. h. first, then r. h.).
Combined Arm-Swing . . .	Var. I & II (at sf), XI (in the melody).
Passing-under of the Thumb	Var. VII (both h.).
Transferring . . . . .	Var. VI (both h.), XVII (l. h. first, then r. h.).
Drop of the Arm . . . . .	Var. XIII (l. h. in sf).
Pressure . . . . .	Var. XIV, XV and the Theme (both hands).

## Chopin's "Studies".

- Op. 10 No. 1. In r. h.: finger strokes in conjunction with rolling action;  
in l. h.: styles of execution of forearm and upper-arm strokes.
- Op. 10 No. 2. In r. h.: finger strokes;  
in l. h.: transfer motions.
- Op. 10 No. 3. In both hands: various styles of execution, chiefly styles of finger strokes and chord-playing methods; in the intermediate part, also of upper-arm strokes.
- Op. 10 No. 4. In both hands: chiefly finger strokes in conjunction with rolling action.
- Op. 10 No. 5. In r. h.: finger strokes in conjunction with rolling action;  
in l. h.: styles of playing chords and transfer motions.
- Op. 10 No. 6. In both hands: finger strokes in semiquavers; it will be found convenient to emphasize the melody in the r. h. by the aid of the combined arm-swing and rolling action.
- Op. 10 No. 7. In r. h.: method of drop of the arm for purpose of achieving legato playing;  
in l. h.: chiefly styles of finger strokes.
- Op. 10 No. 8. In r. h.: motion of the arm in conjunction with passing-under of the thumb;  
in l. h.: the various styles of execution.
- Op. 10 No. 9. In r. h.: forearm strokes in portamento playing;  
in l. h.: finger strokes combined with rolling action.
- Op. 10 No. 10. In both hands: finger strokes combined with rolling action.
- Op. 10 No. 11. In both hands: finger strokes in conjunction with rolling action.



- Op. 10 No. 12. In r. h.: forearm and upper-arm strokes;  
in l. h.: motion of the arm by means of passing  
under of the thumb.
- Op. 25 No. 1. In both hands: finger strokes in conjunction with  
rolling action.
- Op. 25 No. 2. In both hands: finger strokes.
- Op. 25 No. 3. In both hands: finger playing styles in con-  
junction with rolling action and transfer  
motions.
- Op. 25 No. 4. In r. h.: in the staccato — forearm strokes, in  
combination legato-staccato — chord-playing  
methods and finger staccato;  
in l. h.: transfer motions.
- Op. 25 No. 5. In I. & III. parts: in r. h.: forearm or upper-  
arm strokes;  
in l. h.: finger strokes in conjunction with  
rolling action.  
In II. part: in r. h.: motion of the arm with  
passing-under of the thumb;  
in l. h.: finger strokes and chord-playing  
methods.
- Op. 25 No. 6. In r. h.: finger strokes in double notes;  
in l. h.: various styles of performance.
- Op. 25 No. 7. In both hands: various styles of performance,  
chiefly finger strokes and chord-playing  
methods.
- Op. 25 No. 8. In both hands: method of dropping the arm to  
achieve legato playing; moreover, in left hand  
transfer motions.
- Op. 25 No. 9. In r. h.: drop of the arm in accentuation and  
hands strokes in the staccato octaves;  
in l. h.: transfer motions.
- Op. 25 No. 10. In both hands: drop of the arm for achieving  
legato.
- Op. 25 No. 11. In r. h.: finger strokes combined with rolling  
action;  
in l. h.: various styles of execution.

Op. 25 No. 12. In both hands: finger strokes combined with rolling action.

Oeuvre posth. No. 1. In both hands: finger strokes.

Oeuvre posth. No. 2. In r. h.: finger staccato;  
in l. h.: chiefly transfer motions.

Oeuvre posth. No. 3. In r. h.: chord-playing methods;  
in l. h.: transfer motions and finger strokes.

